FOOD MANUFACTURE

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FOOD MANUFACTURE

Vol. XVIII, No. 12 December 1, 1943

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The Editor will be glad to consider contributions from those engaged in the Food Industry. Articles intended for publication should be of a practical nature and accompanied by photographs or drawings when possible.

Amalgamation

PEOPLE are still debating—usually with a degree of passion which is incompatible with a scientific attitude—whether the field of public ownership should or should not be extended after the war. The Tory Reform Committee recently admitted that there may be "a broadening field for State ownership of certain monopolies and State direction of the main lines of our production policy". Messrs. Lever Brothers and Unilever, Limited, on the other hand—in their pamphlet *The Problem of Unemployment*—do not seem to expect that anything good could come from any expansion of State ownership: they denounce all State action (beyond general budgetary and public works policies) in the most unequivocal terms. For instance: "The helplessness of a general planning board would be greatest in regard to the fostering of progress. . . . Collective imagination does not exist. For the cultivation of individual imagination public bodies do not afford a favourable climate," etc. They feel that—quite apart from State ownership—even a comprehensive planning of capital investment through State control would lead to "dangers that outweigh its advantages by far", since it could not be achieved without "a comprehensive organisation of the whole of industry". "The ability of an organisation of that kind," they say, "to deal with major economic problems is, to say the least, open to doubt, nor can one safely assume that its constitution would make it suitable to consider long-term general interest without regard for the immediate wishes of its members. . . . It would involve the placing of overwhelming powers in the hands of organised industry, and the public would sense in it the creation of an era of privilege, no matter what safeguards were introduced."

While this battle of words is going on, things are happening in the field of industry which demonstrate again that deeds are more important than words. The concentration of industry proceeds apace. Giant corporations, which retain—every year—millions of pounds of "undistributed profit", absorb smaller firms and thus establish an industrial pattern which, as far as bureaucratic organisation is concerned, is indistinguishable from the pattern that would be produced by an extension of State ownership. Hitherto independent

business establishments—family concerns in which the principal owners took an active part in the management of the firm—become incorporated into these giants and continue to exist merely as one relatively small department of a vast organisation. Whole industries have thus been brought under the control of one single board of directors. Ownership and management become increasingly divorced from one another, and the only difference which remains between this type of organisation and State ownership is that the former represents practically unlimited power in private hands, whereas the latter would represent power in the hands of persons at least responsible to Parliament and the public.

Once there are combines controlling many hundreds of outwardly " independent " firms, covering an entire industry, it is somewhat difficult to maintain that the " profit motive " of the owners continues to be the public's safeguard against inefficiency, or that " competition " continues to be the public's safeguard against exploitation. When there are thousands or hundreds of thousands of shareholders, it is obvious that the owners' control over the management ceases to function. When there are hundreds of firms existing as mere departments within one large combine, it is obvious that the lack of profitability of any one of them does no longer enforce a revision of policy, since the losses in one department (if they can be determined at all) can be defrayed out of the profits of another. If hundreds of million pounds of capital and tens of million pounds of profits are under the control of one small group of managers, it is obvious that the consumer is totally at the mercy of the monopolistic producer.

Democracy, in the long run, may prove to be incompatible with the ever-growing concentration of economic power in a few private hands.

National Milk-Cocoa

The new welfare food made available on November 13 is a further example of the solicitude exhibited by the Ministry of Food on behalf of adolescents and infants. The food in question has been called National Milk-Cocoa, and is being manufactured for supply to factories and other industrial undertakings for the benefit of workers under eighteen years of age, the object being to provide them with additional protein this winter in an appetising form.

National Milk-Cocoa, which is being produced with the co-operation of well-known manufacturers, is a sweetened blend of spray-processed dried milk with cocoa. It may only be used for reconstitution as a beverage and served only to persons under the age of eighteen at not more than 1d. per one-third pint.

Factory and works managements are enjoined to apply for supplies by letter to the local Food Office, stating the number of employees under eighteen years of age. The Food Office will issue a permit to allow the purchase direct from the manufacturers of National Milk-Cocoa at the rate of 1½ lbs. per employee under eighteen per four weeks; this allows a beverage for each such person of one-third pint a day.

The food will be packed in 20-lb. non-returnable containers, which will cost 18s. 4d. net direct from manufacturers.

Standards for Food

The issue of a White Paper by the Ministry of Food, " The Labelling and Advertising of Foods ", is by way of being an epoch-making event in food legislation. The progress of the protection of the consumer by the determination of food standards has hitherto been woefully slow. Its desirability (the word is the Ministry's) " had been the subject of recommendations by earlier committees and was again emphasised by the Departmental Committee on Composition and Description of Food, which issued its report in 1934. As a result, suitable provision was made in the Food and Drugs Act, 1938. This Act did not come into force until October, 1939, by which date the Ministry of Food was in existence. Consequently, the Minister of Health has not exercised the power conferred upon him by the Act for the determination of standards for food ".

The powers exercised in connexion with the Regulations to be put into force have already been granted by Parliament to the Minister of Health and the Board of Trade. Some changes in the law, however, have recently been made; these have been set out in the Defence (Sale of Food) Regulations (S.R. & O. 1553). Section 6 of the Food and Drugs Act, 1938, is suspended as from January 1, 1944, as far as it relates to food and is re-enacted in a modified form, with special reference to labelling.

An important point to be noted is that under the powers granted by the Regulations the Minister of Food will issue Orders creating standards for particular foods as necessity arises. That such Orders will be well studied is ensured by the appointment of an Advisory Committee consisting of representatives of the Ministry of Food, the Ministry of Health and the Government Chemist's Department, and of public analysts nominated by the Society of Public Analysts and other Analytical Chemists. It is also the Government's intention that in fixing standards full consideration shall continue to be given to responsible trade opinion.

The Regulations require that the labels on prepacked foods shall bear (1) the name and address of packer, (2) the common or usual name of the food, (3) the minimum quantity of food contained in the package, and (4) the common or usual names (but not the proportions) of the ingredients of the food.

The restriction of claims or suggestions regarding the presence of vitamins and minerals in a food in advertisements is an important part of the Government's nutritional policy. In medicinal products in which vitamins and minerals are claimed, their labels have to bear a quantitative disclosure of these ingredients. The Government have decided that a similar disclosure shall also be required in the case of foods in which the presence of these constituents is claimed.

The defences available to traders under the Food and Drugs Act, 1938, and the Sale of Food (Weights and Measures) Act, 1926, are preserved in relation to offences under these Regulations. This continuity is secured by the provision that an Order issued under the Regulations may include the warranty defence and the defence available where some other person is responsible for the commission of the offences charged.

One important point which is new to food law is that prior to bringing any action under the new Order it will be necessary to obtain the consent of the Minister of Food. Another point is that it is no longer necessary to obtain a sale before action is taken, although the retailer may demand that the inspector shall buy a package if he has so interfered with it that he has spoiled it for sale. The fact that an article is on sale is now sufficient.

The new Regulations constitute a step forward in the improvement of our food laws, and it behoves every food manufacturer to study both the White Paper and the Defence (Sale of Food) Regulations, 1943, without delay.

Combined Food Board and London Food Committee

The Combined Food Board was set up in June, 1942, by the President of the United States and the Prime Minister of the United Kingdom with a view to assisting in the integration of the food policies of the United Nations. As a complement to the Board the London Food Committee was also established. This combined food planning organisation has now been operating for 15 months and has made a valuable contribution to this most important sector of the total war effort, states a recent Ministry of Food communication.

In order to ensure that the valuable work which has already been done can be continued and extended in future, the combined food planning organisation has recently been re-examined. In particular, the position of Canada has been reviewed in the light both of that country's contribution as a major supplier of foodstuffs and the participation of Canadian representatives in the work of the Committees of the Combined Food Board, coupled with the acknowledged inter-relationship of all North American problems. As a result of that review, arrangements have been agreed by which Canada will become a member of the Combined Food Board in Washington.

The London Food Committee, which was established at the same time as the Combined Food Board to perform functions in relation to the countries represented upon it complementary to those of the Board, is being reconstituted as the London Food Council. The Minister of Food in the United Kingdom will be the Chairman, and the High Commissioners in London for the Commonwealth of Australia, New Zealand, the Union of South Africa and Southern Rhodesia, the Secretary of State for the Colonies, the Secretary of State for India, and the representative of India at the War Cabinet, will be members.

Electrolytic Tinning

It has been recently announced that Richard Thomas and Co. will install "at the earliest possible moment" an electrolytic tinning unit in the Ebbw Vale plant.

In connexion with this process it is instructive to learn that from October it has been made compulsory for certain purposes in the U.S.A., in order to save tin. As a result, it is calculated that about three-fifths of all this year's American tinplate will be electrolytic, as compared with less than one-twentieth in 1942.

Under the regulation a large number of foodstuffs, including fish preserves, soups, several vegetables, and certain types of frozen fruit, must now be packed only in electrolytic tinplate containing no more than $\frac{1}{2}$ lb. of tin per box of tinplate (100 lbs.).

For all types of milk, electrolytic tinplate containing $\frac{3}{4}$ lb. of tin per box must be used. Nearly all these articles have hitherto been packed in containers of hot-dipped tinplate containing $1\frac{1}{4}$ lb. of tin per box. The saving of tin is estimated by the War Production Board at 6,000 tons a year.

Soya Grit in Sausages

Criticism which has been made recently in food trade circles that soya grit as issued as a filler has proved unsatisfactory has been refuted in Scotland by satisfied users, who contend that the failure lies in the methods employed rather than in the product itself.

When soya grit was first made a compulsory ingredient some months ago Glasgow butchers hailed it as a satisfactory addition, but this attitude was not shared by some English critics, who condemned the soya as being quite unsuitable.

Commenting on this, one of the most prominent Scottish sausage-makers said: "There's nothing wrong with soya grit. The real point is that not every maker knows how to use it. When we first tried it out I admit that it was not a success and

we knew that our sausages were not up to standard. But it was our fault and not the fault of the ingredients. After the first week we got down to the job and discovered how to use the grit, and now we are putting out an excellent sausage. There is only one thing wrong with the present-day sausage and that is lack of meat."

In this sausage-maker's opinion the secret of successful use of soya grit lies in its treatment. If too much water is added during the mixing, the soya tends to sour and to make an unpalatable sausage, but that is a defect in the preparation and not in the actual product used.

There should, he believed, " be no reason for unpalatable sausages if the makers used their intelligence and exercised due care in production. Naturally, each sausage-maker had his own recipe and method and swore by those, nor would the average producer divulge them to his competitors. The inclusion of rusks to a fixed proportion, for instance, was one aspect of successful sausage production using soya, and this should be carefully studied, as should also the limited use of water."

Urea as Protein Substitute

The value of urea as a partial substitute for other protein in the feeding of dairy cows has been discussed in a paper by E. C. Owen, J. A. B. Smith and N. C. Wright, of the Hannah Dairy Research Institute, Kirkhill, Ayr (*Biochem. Jnl.*, 37, 1, 44). Urea was fed to seven lactating animals in an amount equivalent to 35 per cent. of the nitrogen in the production ration, or to 23 per cent. of the total nitrogen intake. Data for milk yield, body weight, nitrogen balance and milk composition obtained while feeding this diet were compared with the corresponding data obtained when the animals were receiving (*a*) blood meal and no urea and (*b*) neither blood meal nor urea.

The milk yields of five of the seven animals were well maintained when blood meal was replaced by urea. With four of the five cows under test a rapid and significant decrease in milk yield took place when urea was removed from the food. Changes in body weight were not marked at any stage of the experiment, but on the whole they seemed to be better maintained on urea than on blood meal.

Among a number of other conclusions it was found that the urea content of the blood tended to increase at the outset of the urea period, and then to return towards its initial value as the urea feeding progressed. The urea content of the milk closely approximated that of the blood and never exceeded 28 mg./100 ml. (0·16 g. per pint), an amount which would not have any deleterious effect on the consumer. The ingestion of urea had no measurable effect on the percentage of protein, fat, lactose or total solids in the milk.

Metals in Milk

It has recently been demonstrated that milk normally does not contain sufficient copper and iron for the requisite amount of hæmoglobin to be formed. As a result, feeding an animal continuously on milk is followed by anæmia. A patent has recently been issued to Professor Hart and his associates covering this matter of supplying these deficiencies in milk in order that it could be made into a more complete food.

Great efforts have been made during recent years in eliminating all copper equipment from milk plants, one of the reasons being that dairy products that take up copper from the equipment are inclined to develop objectionable flavours within 48 hours. It is interesting to note that this same copper to which objections have been made so strenuously and to avoid which so much money has been spent is a valuable health factor when added to milk. In connexion with the attempts to transform milk into a perfect food it is proposed to add not only iron and copper salts but also manganese.

The addition of accessory food substances to milk, if it ever takes place, would be revolutionary, but, if the technical details of such "fortification" could be satisfactorily worked out, milk would seem to be an excellent vehicle.

Shakespeare—and Potatoes

It has been said that if Cleopatra's nose had been half an inch longer the history of the world might have been changed. We may also suppose that if Helen of Troy's face had been pitted with smallpox it would have been unable to "launch a thousand ships". The writer of a letter to the *Daily Telegraph* has been indulging in this "If" game. He says that " Shakespeare's signature and his facial appearance, as shown in standard portraits, have caused many to doubt if he could be the author of works associated with his name. How is it possible, it is asked, for a man whose writing demonstrates his illiteracy to have produced such works as these?" He suggests that Shakespeare's signature is the writing of a man with writer's cramp, and that scurvy was the cause of the " extreme baldness, the dull eye, the bloated face, the peculiarly shaped mouth indicating the loss of front teeth". The writer concludes with the assertion that "if only potatoes had formed part of Shakespeare's diet, we might have had works greater even than 'The Tempest' ".

It is some time since we indulged in parlour games, which seem to have gone out of fashion, but doubtless readers could think of many examples similar to the one quoted. Perhaps it would be better to abstain if the poet was right who said:

> For of all sad words of tongue or pen
> The saddest are these: "It might have been!"

Hydrogenated Fats

PART II

H. R. MITCHELL, M.I.Chem.E.

The Hydrogenator

MENTION has already been made of the many ingenious methods and appliances which have been invented and operated from time to time dealing with the plant in which the actual hydrogenation of the oil is effected, commonly referred to as the hydrogenator, catalyser or converter. In general it now consists of a cylindrical vessel with either a coned or dished bottom, heating and cooling coils, the latter being required since the reaction is exothermic. A typical example is shown in Fig. 4, where the distribution of the catalyst in the oil is obtained by means of a mechanical agitator assisted by a gas spray at the bottom of the converter.

The method of conducting the hardening operation is as follows. The charge of oil is pumped to the converter. An evacuation system removes air and moisture. The calculated quantity of oil-catalyst mixture—prepared by either of the methods just described—is added, the agitator keeping the whole thoroughly mixed. Heat is applied and the temperature raised to approximately 120 to 130° C. Hydrogen is then admitted and the gas pressure is raised to the required operating pressure. At this point careful watch is kept on the temperature, particularly with a new catalyst, and if necessary the cooling system must be brought into action to control any undue rise in temperature due to the effects of exothermic reaction.

Controlling the Process

Depending on the activity of the catalyst and/or the degree of hardness required, tests are made periodically after about one hour. Quick methods of determining the setting point of the hardened oil are available, but control can be easily maintained by means of a Butyro-refractometer alone. When these simple tests indicate that the desired hardness has been obtained, the hydrogen supply is stopped, the charge cooled and then pumped to the filter press. Here the catalyst is removed; in the case of a catalyst prepared by the wet method a small quantity of Fuller's earth or one of the other recognised filter aids is previously added to facilitate the removal of the catalyst.

From this point, care must be taken to see that the oil is not too hot, otherwise the colour and quality of the hardened fat will be spoiled. The temperature will materially depend on the degree of hardness of the product, but it should seldom be higher than 65 to 70° C.

The clear filtered hardened oil passes to a hardened oil tank where it is stored under carefully controlled temperature conditions until required to be deodorised.

The catalyst remaining in the filter press, according to the method adopted, is either mixed with a fresh batch of oil and used over and over again until its activity reaches the uneconomic point as regards time required to harden a given batch of oil, or it may form the bulk of the next batch of catalyst to be used with a small addition of fresh material, a corresponding amount of the used catalyst having first been rejected.

In most refineries where oils are only partially hardened for edible purposes the consumption of catalyst is so small that unless very large quantities of oil are treated it is not economic to recover the nickel.

Spent catalyst contains oil, filter aids and other substances inherent to the process, and it is generally considered more practical to dispose of the material in this form. The wisdom of this will be better appreciated when one realises that in many refineries hardening the usual qualities of vegetable oils for edible purposes the consumption of nickel over a long period has not exceeded 1 lb. per ton of oil treated.

Continuous Processes

During recent years the urge has been felt in most industries for continuous processes, and the edible oil

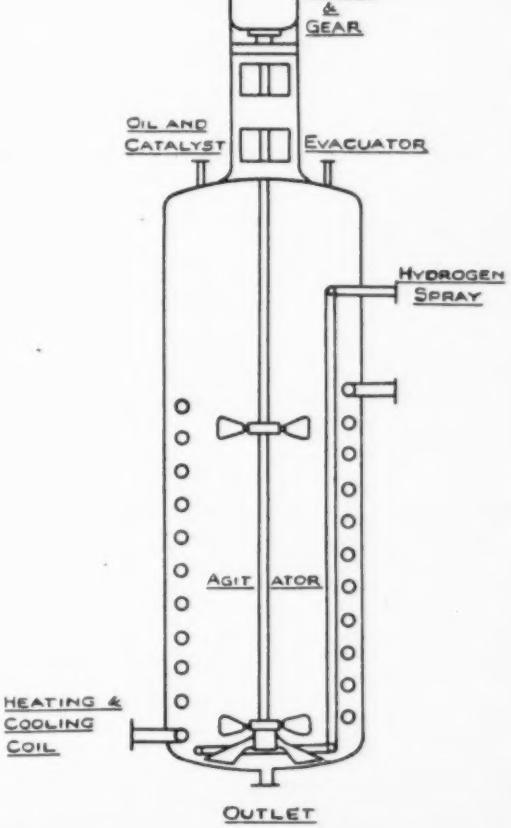

Fig. 4.—Converter or Hydrogenator.

industry has by no means been immune from these demands. It has seen the development of continuous refining and continuous deodorisation. Hence the apparent need for a continuous hardening process, which is the intermediate stage in the complete production of edible hardened fats from crude oils.

Obviously for a process to be continuous it is necessary for the oil to be hydrogenated to flow through the catalyst; thus in contradistinction to the intermittent, or as it is more commonly known, the Batch system, the catalyst must be rigid instead of being in powder form.

It is over twenty years ago since Bolton first established the principle of continuity in the history of hydrogenation, and showed that an oil flowing through a stationary nickel catalyst could be converted into hydrogenated fat and withdrawn from the reactor in a continuous stream.

Rigid Catalysts

A rigid catalyst may be prepared in one or two forms. The usual method of preparing powder catalysts by the precipitation of nickel on to a carrier—viz., keiselguhr—has already been described. In the same manner also it is possible, by using some kind of porous material in the form of pellets, cylinders, or rings, to precipitate nickel on these and to pack into cages or similar holder, so forming a rigid mass. Catalysts of this " impregnate " type are in general use in many of the chemical industries, and undoubtedly such catalysts, by virtue of the very extensive surface area of the support, possess a large catalyst concentration.

Many of them suffer, however, from the same defects as did the supported powder catalysts; impurities of or inherent to both the catalyst preparation and the support. Moreover, they are not easily reactivated. The superiority of the nickel formate method of catalyst preparation in this respect has been amply illustrated.

The satisfactory production of a rigid " superficial " catalyst is by no means a simple matter. Since 1922, when Bolton and Lush produced the first practical example of this type, many attempts have been made to make a really satisfactory superficial catalyst for the hydrogenation of oils. The majority failed by reason of not being able to provide sufficient catalyst concentration in proportion to the bulk of inert or non-catalytic support.

Requirements for "Superficial" Catalyst

This type of catalyst must rely on the depth of surface layer as well as the effective superficial area it can present, so as to provide a practical concentration. The actual catalyst—this is, the part excluding the supporting or non-catalytic portion, must be diffuse, so as to make direct contact with the reactants regardless of the form or other property of the catalyst. Thus it will be seen, to procure a surface which will stand up to turbulent flow and reactivation procedure, at the same time to be diffuse and deep, is to demand a very severe specification. A surface answering to these characteristics must be substantially integral with the support and adherent.

Continuous hydrogenation of oils, with a rigid superficial catalyst, has been in active use for at least fifteen years, but it has never reached the stage of becoming a serious competitor to the Batch processes. Although it may be considered suitable for small outputs under certain specific conditions it has not so far been a good proposition where anything over 10 to 15 tons per day were required.

One particular method of continuous hydrogenation which has gained some degree of popularity uses a rigid catalyst in the form of either a mass of nickel turnings packed into a gauze container or alternatively a large number of perforated nickel discs assembled into a cylindrical block. These are never disassembled and are made to fit into the reactor in which hydrogenation takes place.

Activation of Catalyst

The catalyst is activated in two stages; first it is immersed in an earthenware bath containing sodium carbonate solution. Surrounding the block is a hollow cylinder of nickel; the catalyst block and the nickel cylinder are connected to the terminals of an electrical circuit so that the former becomes the anode and the latter the cathode. A small current is passed and the oxygen liberated at the anode gradually oxidises the surface of the nickel. This oxidation proceeds for a specified time, and then the catalyst blocks are removed from the oxidising bath and thoroughly washed.

The second stage is the reduction of the nickel oxide to catalytic nickel. This is accomplished in the hydrogenating unit itself by heating the catalyst in a slow stream of hydrogen until the absence of water in the hydrogen emanating from the plant indicates that all oxide has been reduced.

The Hydrogenation Process

The hydrogenation plant consists of a number of jacketed vessels, each of which contains one or more catalyst blocks, with a feed vessel and heat exchanger at one end and a separator and cooler at the other (Fig. 5).

The oil to be hydrogenated is preheated and forced by hydrogen pressure into the first reaction vessel with a current of hydrogen, and having passed through the catalyst in this reactor proceeds onwards in the same manner into and through the second and so on through the whole series. The oil in its passage becomes hardened, is freed from excess hydrogen in the separator and passes out through the cooler, where the temperature is reduced to a degree which permits its coming into contact with air without detriment to colour and quality.

Comparison of Hydrogenation Methods

Having described in some detail the principal plant and processes in use at the present time, it only remains to make such comparisons as some twenty-five years' experience of the industry in general and a practical study of the various methods of hydrogenating oils in many parts of the world enables one to do.

Before the inception of the Batch method incorporating the " Wet " process of catalyst reduction, the Continuous process may have had certain advantages compared with the older Batch method, which used the " Dry " reduction supported catalyst process. The

" Formate " process has, however, in the opinion of the vast majority of technologists and industrialists, succeeded in overcoming all the disadvantages of the older method.

Moreover, plant in general is now constructed on smaller and improved lines with a corresponding decrease in capital outlay, so that to-day oil hardening is not exclusive to the manufacturer of 50 tons and over per day, but is equally an economic proposition for the refiner of only 5 or even less.

The term "continuous " implies continuity of operation. In actual practice, however, no process of this type has as yet attained this over any considerable length of time. Periodical reactivation of the catalyst is necessary, and during this time, usually anything from two to four days, the hardening unit of the plant is out of commission and production is completely stopped.

As has been already mentioned, with any well-designed plant operating the nickel formate process the provision of a catalyst mixing tank after the catalyst reducer and the ease and rapidity with which a new batch of catalyst can be prepared enable sufficient catalyst to be reduced and made ready for a number of charges of oil to be hardened. The standing time between the finish of one hardening operation and the start of the succeeding one can be reduced to less than one hour. This to a large extent, if not entirely, neutralises the advantage of the periodic continuity of the existing continuous processes.

While the reactivation of the rigid catalyst is simpler and cleaner than the older dry reduction supported catalyst, this operation consists of six separate stages :

1. Cleaning of catalysts by solvent extraction and steaming.
2. Removal from plant to oxidation baths.
3. Oxidation.
4. Washing and draining.
5. Replacement into plant.
6. Reduction and subsequent cooling to operation temperature.

The preparation of the catalyst from nickel formate and its introduction into the charge of oil to be hardened consists only of three operations, and these are carried out simultaneously and independently of the actual hardening stage. They are :

1. Reduction of nickel formate at specified temperature under accurate automatic temperature control for a period of three to four hours.
2. Transfer of the required quantity of catalyst for a given charge of oil to the catalyst mixing tank where it is mixed with some of the oil charge, ready for
3. Transfer to the converter as soon as the preceding charge of hardened oil is out.

The utilisation of the " permanent " catalyst used with the continuous process described, obviates the necessity of continually buying fresh supplies of catalyst; the initial cost of the catalyst, however, is very high. Compared with the consumption of nickel formate over a given period, the relative cost of catalyst nevertheless depends to a large extent on the " life " of the " permanent " catalyst between periodic reactivations. With the majority of oils in common use this " life " does not generally exceed thirty days.

As already indicated, the author has had many opportunities of seeing various types of hardening plant in actual operation, and, generally speaking, while the continuous process possesses qualities of simplicity, cleanliness and ease of operation, the results were on a par with what are seen almost invariably with a wet process Batch plant.

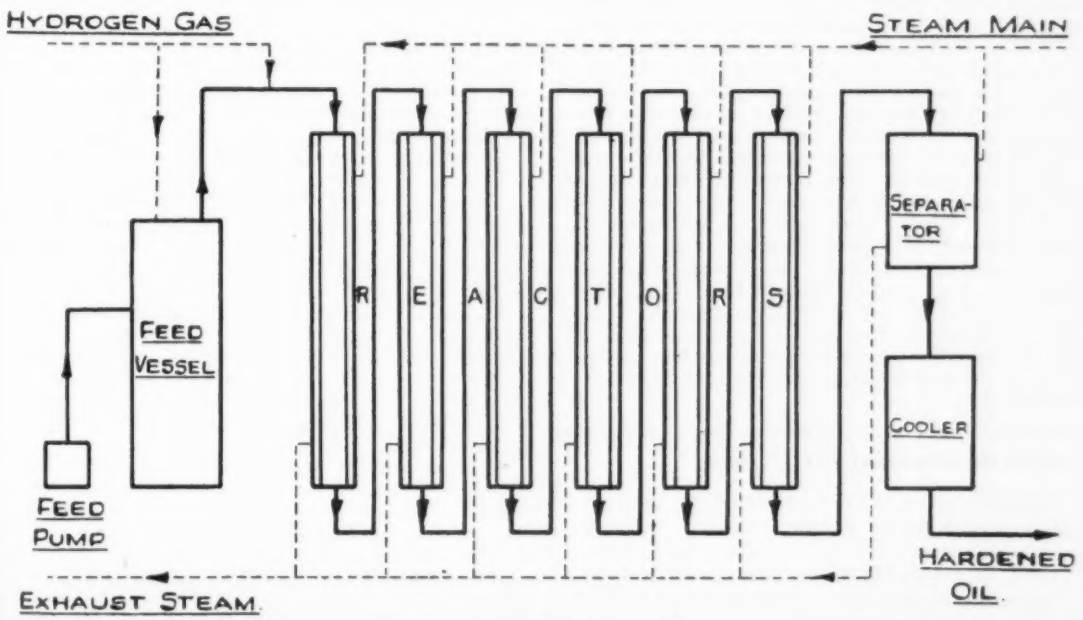

Fig. 5.—Continuous Hydrogenation with Rigid Catalyst.

Quality of Product

No consideration of the respective merits of any plant or process, however, would be complete without mention of the product. Actually it is the product which must be the deciding factor. In this respect, the nickel formate wet-reduction process, with its flexibility of operation, a catalyst with greater activity, high selectivity, absolute uniformity and a stronger resistance to catalyst poisons enables manufacturers large and small to produce hardened fats of superlative quality. Many experienced technologists have indicated that the construction and constitution of the catalysts in continuous methods are fundamentally unsuited for certain reactions in the process of oil hardening. As a consequence of these restricted characteristics, the resultant product suffers in those qualities which are now demanded in the production of shortenings, cooking fat and margarine. On the other hand, the use of one with the qualities of the nickel formate catalyst results naturally in uniformity of product between batch and batch, and hardened fats possessing homogeneous and plastic consistency, able to withstand a wide range of temperature and conditions during transit and storage without loss of quality.

The United States of America undoubtedly produce, and have done so for some years now, a much greater tonnage of hardened fats than any other country. The dry-reduction type of catalyst is still used by some of the old plants that started with it and have not been sufficiently progressive to change. The large majority, and particularly all the more important companies, have now changed over to wet reduced catalyst.

Future Developments

Undoubtedly the ramifications of catalytic hydrogenation in the fat industry during the past forty years have been remarkable, and for some twenty years scientists, including those of our own University of Cambridge, have had something more than a passing interest in the phenomenon. Those who have read Dr. Rideal's Jubilee Memorial Lecture to the Society of Chemical Industry will appreciate the extent of the advances made since the days of Sabatier and Senderens. Nevertheless, it is realised that there is still a fair amount of rule-of-thumb working, and the process as yet is not completely under control. From time to time rival theories have been enunciated, and even wild speculations made, to explain peculiar happenings which did not fit in with the knowledge and experience of the moment. Thus there remains a great deal more work to do, and those of the food industry must continue to play their part, more particularly by a much freer interchange of ideas and experience than has been the rule, if the progress which has been achieved so far in the production of hydrogenated fats is to be maintained.

British Material for Export

Overseas readers are advised that the fact that goods made of raw materials in short supply owing to war conditions are advertised in FOOD MANUFACTURE should not be taken as an indication that they are necessarily available for export.

Organisation of Technical Intelligence Services

AT the first meeting of the twenty-first session of the Society of Chemical Industry on October 4, Mr. S. J. Johnstone, O.B.E., B.Sc., F.I.C., M.Inst.M.M., gave a lecture on the Organisation and Use of Technical Intelligence Services.

Mr. Johnstone described the work at the Imperial Institute. It is divided into two sections, Plant and Animal Products and Mineral Resources, and it was the industrial angle which they covered at all times. The library consists of 80,000 volumes, and no cutting of periodicals is allowed. He emphasised the necessity of an intelligence service maintaining personal contacts with associations and individuals in order to strengthen the knowledge of the department. A list of consultants is maintained at the Imperial Institute from which they make recommendations as and when the occasion arises.

Several other speakers described their work. Dr. Withers, Librarian of the British Cotton Industry Research Association, was of the opinion that abstracts were not of necessity lacking in value if not up to date. The permanent record for future enquiries depended upon accuracy. In his department the work covers subjects from cotton, rayon, artificial silk, silk and cellulose, string, and all related subjects and abstracts were dealt with and published through the Textile Institute.

Miss Parker of the Mond Nickel Co., Ltd., explained the necessity for rapid information to technical staff and for encouraging them to save notes after technical reading. They maintain a running bibliography on all allied subjects.

Mr. Freeman-Horn, of the British Aluminium Company, dealt with abstracts. There are, in his opinion, two forms of abstracts, scientific and industrial, but no overlapping can occur when the publication is abstracted in the interests of an industrial concern. There should be directive abstracts (if the journals are available) and informative abstracts are non-technical as a guide to *all* readers. He maintained that it was impossible to keep stocks of literature for longer periods than ten years, and emphasised the value in this connection of micro-photography.

Miss Shaw, of J. Lyons and Co., Ltd. (Laboratories), dealt with the provision of information to technical and laboratory staff. The staff are encouraged to indicate which articles should be abstracted and filed for permanent reference.

Miss Ditmas, of A.S.L.I.B., gave a description of the work of her organisation and the value of co-operative dissemination of information and advice. Her organisation acts as a clearing house and has recently introduced a location Index of overseas publications which provides a very valuable adjunct to any librarian's fund of knowledge.

Mr. Fullman, Information Officer of the British Non-Ferrous Metals Research Association, in the closing address described his association's methods of abstracting and of circulating special factors between issues and reports where the time limit was essential. Mr. Fullman explained the method of co-operation used for the collation of knowledge on a particular subject which has been dealt with by the various departments and members of his council.

Dehydrated Foods

SPECIALLY CONTRIBUTED

AT THE recent demonstration of dehydrated foods and the methods of their preparation, organised by the Department of Scientific and Industrial Research, at the request of the Ministry of Food, at Cambridge, Sir Joseph Barcroft, Chairman of the Food Investigation Board of the Department of Scientific and Industrial Research, in his speech of welcome to the delegates gave some interesting details regarding the position of the Low Temperature Research Station and other organisations which work in close collaboration with it. "The Low Temperature Research Station is one of three stations which function under the auspices of the Food Investigations Board. That Board covers one of the many activities of the Department of Scientific and Industrial Research, activities which range from research on the properties of the upper atmosphere to research on the uses of coal. The Department and its sister bodies, the Medical Research Council and the Agricultural Research Council, all come under the Committees of the Privy Council. They are all responsible in the last resort to the Lord President." Sir Joseph emphasised the Agricultural Research Council because, while the Food Investigation Board is responsible for research on foodstuffs, the Agricultural Research Council is responsible for research on growing crops, on livestock, and on such livestock products as milk and butter. "Our responsibility begins when these products have left the farm; but in practice many problems are common to us both, and we work closely together," he said.

"The work of the Food Investigation Board is carried on at three stations—the Torry Research Station at Aberdeen, which exists essentially for research on the preservation of fish, the Ditton Laboratory near Maidstone, which deals with fruit, and the station here, which deals with other articles of food. I would gladly welcome you at all these centres, but to-day we have adopted for you the more time-saving expedient of asking Dr. Reay, of Torry, and Dr. West, of Ditton, to come here so that you may meet them and see the tangible evidence of their work. Indeed, the work carried on at the three stations is not so clearly separated as I have indicated. Thus the plant at Torry, erected for improvement of methods of curing fish, has been most useful for the study of drying meat, while at Ditton there is an experimental ship's hold which can be used for investigation of cargo-refrigeration irrespective of the nature of the foodstuff. To pass from generalities, for the last three years our work has dealt almost entirely with dehydration; in this we are not alone. The preservation of food by drying it is a very old conception: moreover, it is of the essence of war that people in one centre know much less about what their neighbours are doing than in times of peace. In the United States, in Canada, in Australia, in New Zealand and in South Africa work has been going on—I need only mention one among many excellent commodities which our neighbours have produced, the dried milk powder which for some years has been manufactured in Canada. Nor is it to be supposed that research on the drying of foods is confined to one side in the present struggle.

"When work is carried on independently in various places geographically separated it often happens that one locality concentrates on one phase of the problem, whilst other phases are stressed in other places. This is not altogether haphazard; it depends upon local conditions and even national characteristics. But the happy result is that when the whole series of researches is put together the information from the various centres is not merely a reduplication but a true synthesis of observations which are complementary to one another.

"The Food Investigation Board has thus concentrated on quality. Quantity indeed is scarcely our business. Once we have brought a product, say, dried cabbage, up to the point of producing a really satisfactory article on the scale of a few tons—*i.e.*, once we have shown that it is a practical proposition—it passes, in this country, over to the Ministry of Food, who are responsible for the development of the manufacturing processes up to what I may call the "Cargo Scale". I need hardly emphasise that, while this cleavage exists on paper between the activities of two quite separate Government Departments, in practice the work is carried on in such close touch as to make the demarcation line something which it would not be easy for a casual observer to discover.

"The object is to produce dried foods which, when reconstituted, will be no less wholesome and no less

TABLE 1

Indicating the attainable *saving* calculated as between the most compact form and the form in which the commodity is most usually carried; and the attainable *storage time* after which the food is still in excellent condition, in gas-pack if necessary.

Food.	*Storage Time.*	*Saving per Cent.*		*Comparison with—*
		Weight.	*Bulk.*	
Meat	Indefinite	80	84	Frozen carcase, bone in
Fish	At least 1 year	90	85	Whole fish
Milk	Several years	87	89	Liquid milk
Egg	At least 1 year (temperature not higher than 60° F.)	80	90	Shell egg
Cabbage	2 years	95	87	Vegetables off farm
Potato	2 years	83	85	Vegetables off farm

tasty than the original materials from which they were made. Here let me repudiate once for all any idea that bad food when dried and reconstituted can be converted into good food. Any suggestion that our dried materials are *ersatz* foods must be set aside at once. It is true that in some cases our methods of processing mean less loss on nutritive value in the subsequent culinary operations than is the case with ordinary cooking; that, however, is another matter. By and large we would make no claim that the product which we serve is better than the original from which it was made.

The word " wholesome " indicates the place where I may appropriately emphasise our debt to the Medical Research Council. Our dried products have been subjected to the most drastic tests in various directions, and for these we have to thank the Medical Research Council and, in particular, Dr. Leslie J. Harris, of the Dunn Nutritional Laboratory."

Dairy Products

In the work on dairy products the Hannah Institute for Dairy Research and the National Institute for Research in Dairying, Shinfield, Reading, have taken a leading part. Spray-dried milk is more readily soluble than is roller-dried milk and can be reconstituted more easily. Spray-dried, whole-cream milk, a product not yet generally available to the public, was demonstrated at the laboratory. The reconstituted product—reconstitution took only a few seconds—is scarcely distinguishable from milk fresh from the cow both in appearance and taste, and when gas packed will keep for several years. Another interesting product is canned moisture-free butterfat, which can be easily reconstituted into butter or used as it is.

Vegetables, Fruits, Meat, Eggs and Soup

The dehydration of vegetables on a large scale, resulting from the experiments carried out at the Low Temperature Research Station, has already been described in FOOD MANUFACTURE, August, 1942. Intensive experimental work has also been carried out on dried soups, eggs, fruits and meat. One important development is the packing of dried meat in " plasticised " gelatine, which is an effective substitute for tinplate.

The experimental work on fruit is carried out at the Ditton Research Station under Dr. West. This was described in FOOD MANUFACTURE, August, 1943.

Saving of Space and Storage

Some interesting details were given on the remarkable savings in transport or storage when dried foods are handled in the place of fresh ones. They are summarised in Table 1, which also indicates the no less remarkable gain in stability as compared with the perishability of the raw produce.

Meat Dehydration in New Zealand

CONDITIONS in the meat trade of New Zealand are now satisfactory to the Meat Producers Board. Under the agreement in 1941, renewed for the 1942-43 season, whereby the Government contracted to purchase the normal exportable surplus of meat, buyers of export meat continue their purchases and the freezing companies slaughter and freeze for export without fear of financial difficulties.

Contrary to expectations, the 1941-42 season finished with only a small carryover of unshipped meat. During the 1942-43 season shipping space, while short in the beginning, improved later to the extent that next season there will be no heavy carryover under the contract to supply the United Kingdom Government with a minimum of 2,500 tons of dehydrated meat during 1943 and to increase the quantity to 5,000 in 1944. An efficient plant is now in operation in Auckland, and production will be at the rate of not less than 5,000 tons yearly.

The contract is for three years, and it provides that prices be paid by the British Ministry of Food on the basis of the frozen schedule prices for export meat, plus costs of processing, as well as a contribution towards the capital cost of the plant at the rate of 20 per cent. per annum throughout the contract. Of this kind of meat 2,500 tons are equal to about 14,000 tons of New Zealand carcass meat, so that exports will save this equivalent of refrigerated space in cargo ships.

During the past few years New Zealand accepted small contracts, amounting to about 150 tons, of dried meats a year by an Auckland firm. The new plant to achieve this has been designed after collaboration with experts in Great Britain. It therefore embraces the most recent improvements.

Beef only is being handled at present, but the installation—completely self-contained—can deal with mutton, lamb and bobby calves. The output of the finished products has been 1 to 1¼ tons daily but, working an 8-hour shift, 6 to 8 tons can be processed.

Normal slaughterhouse methods are followed, and the meat goes into the freezing chambers until required. It then comes out to a conveyer, which distributes it along a series of defrosting tanks, where it is soaked for 8 to 12 hours. Lifted to a long drainage table running parallel with these tanks, it is dealt with by the trimmers, who remove gristle and sinew. Trimmings are disposed of in the ordinary way. The meat is then cut into pieces about 8 pounds. These are fed into an electric slicing machine, which deposits the meat into a steel basket of about 400 pounds capacity.

By the next process the meat goes by overhead rail to the scalding tanks, where it is parboiled for 20 minutes, and then lifted by a crane to a table, where it is fed through a mincer into trays. An automatic spreader distributes the meat over these trays, which are then taken along by a conveyer to trolleys which hold 96 trays each. At this stage the actual process begins. There are four tunnels, divided into four sections, each with a different temperature, gradually decreasing with each section. Two loaded trolleys are

pushed into No. 1 section of each tunnel. They remain in each of the sections for two hours and pass through the whole tunnel in eight. As each pair of trolleys moves from one section to another, two more are hooked on in trailer fashion—a continuous train of trolleys passing through the tunnel.

The trolleys are drawn out by a windlass. By this time, thoroughly dried, the product is tipped into a bin, from which it is fed to automatic presses and then packed and cased by normal factory methods. One ton of fresh meat in this way produces about a quarter of a ton of the new product in granulated form. Soaked from 8 to 12 hours, the meat returns to practically the same condition it was in when it came through the mincer, and the meat is ready for use in sausages, rissoles, stews, curries and pies.

Dairy Engineers Association

A SPECIAL general meeting of the Dairy Engineers Association was held on October 7, mainly for the purpose of approving the Articles of Association and confirming the election of members and directors. The general outlines of a suggested scheme of obtaining the maximum production from dairy engineering firms had been sent with the notice convening the meeting, and it was arranged that the chairman should address the meeting to amplify the written matter which the secretary had circulated.

It was explained that one of the greatest obstacles to putting forward any concrete scheme was the fact that the exact requirements of the country are not yet known in definite terms. Many of the details envisaged in the scheme were not in accordance with the wishes of some of the members who placed the greatest possible stress on preserving their individuality of action, as well as the value of their firms' connection with the dairy industry. Mr. Clarke in his speech showed very clearly that the scheme must reach enormous proportions because of the size of the task that has to be performed. It is surprising to realise how little of the total national milk supply is heat-treated and how much additional equipment the engineers would have to build and instal within a very short period if the maximum safety as required by the Government is to be obtained. The chairman's report in the form of a suggested scheme was at least the first step towards something tangible, which could either be approved or criticised adversely by the members. It is probable that there will be several more steps and suggestions before common agreement can be reached on the best method of serving the public interest and maintaining as far as possible the maximum welfare of the trade.

Mr. Clarke had the utmost support of the meeting in the very difficult task that he had of attempting to reconcile the indefinite and vague requirements of the total scheme to the manufacturing ability of the dairy engineers. He was helped very considerably by the fact that he had been authorised to tell the members that the Ministry of Food had so much faith in the scheme that they were prepared to extend quite a number of concessions to the dairy engineers if only they would organise themselves into a strong and highly representative association, duly registered and with power to speak for their trade, and in return it was natural that the members then present at the general meeting should have a similar faith, and do all that they possibly could to help to put the scheme into operation as smoothly and as efficiently as possible. It will be necessary to have further discussions with the Ministry in order to evolve a scheme of supplying machinery which will be satisfactory to all parties, and it was agreed that as soon as something concrete had been worked out a further general meeting should be convened in order to submit the details to the members.

The Articles of Association, which had been drawn up by the secretary in consultation with the legal advisers, had been very carefully examined by the Board of Directors at previous meetings, and the draft now submitted to the general meeting represented an agreed basis upon which the registration of the association could take place. The title of the association was changed from Association of Dairy Engineers to Dairy Engineers Association. The officers of the association returned to office were: Mr. Frank J. Clarke, president; Dr. H. B. Cronshaw, honorary treasurer; and Mr. Peter K. MacKenzie, honorary secretary. The board of directors is: Mr. Frank J. Clarke (president of the association and chairman of the board), Dr. H. B. Cronshaw (honorary treasurer), Mr. Peter K. MacKenzie (honorary secretary), and Messrs. Graham Enock, E. A. Shepheard, J. Matthews, J. S. Clayton Marshall, H. W. Hiron, Captain A. F. Gear, H. P. Stoate.

Heat Insulation

A SMALL but competent treatise,* written by a refrigerating engineer with evident wide practical experience in the field of insulation, deserves the attention of all engineers who have to deal with this subject. The book is mainly based on the publications from Dr. Ezer Griffiths and his colleagues of the National Physical Laboratory which have been summarised in the pamphlet "The Transmission of Heat by Radiation and Conviction (Special Report No. 9, Food Investigation Board)." The figures for test results recorded have also been confined almost entirely to those due to the National Physical Laboratory.

Since conductivity measurements on very poor conductors are not easy to make, the author has stressed the importance of using a standardised form of apparatus in determining the thermal conductivities of various insulating materials. The book presents much of the valuable work of the National Physical Laboratory in a form suitable for use by engineers for industrial design and by architects in the field of the domestic type of buildings, the thermal control of which is likely in the future to be accorded more attention. A considerable portion of the treatise is concerned with refrigerated buildings and should prove useful to engineers in the food industry.

W. C. P.

* *The Thermal Insulation of Structures.* By G. Yate Pitts, M.Eng., F.R.S.A. 10s. net.

The Communal Restaurant

THERE are now considerably more than 2,000 " British Restaurants " in the country. These have come into being as a result of wartime needs, and have now become almost a social institution. But will they survive into the days of peace? Has the public grown so familiar with them that it will demand civic restaurants to be permanently established? A report* dealing with the problem from every angle has been recently published.

More than forty civic restaurants in London, regarded as typical of those in the country as a whole, were carefully studied in the spring and summer of 1943. One in every ten of the diners undertook to fill up a detailed question form; from their replies conclusions have been reached about the type of public that frequents these restaurants and its reactions to them. A few of the facts discovered may be enumerated.

The adult population of all ages and of both sexes seems equally attracted by the restaurants. In fact, the proportion of people of different ages who frequent them is probably just about the same as the proportion of the wartime population of London. A growing number of black-coated workers and professional people are found to be acquiring the Civic Restaurant habit; the report says that often a single spy from a block of offices will soon infect numbers of his colleagues with the taste. The restaurants are also favoured by a large body of manual workers from factories and railways; and the mixture of social types in many of the restaurants is very obvious.

About 8 per cent. of the diners are elderly folk, mainly old-age pensioners. Several of the restaurants arrange to give them full meals at special prices and allot tables to them. The pensioners, in their replies to the questions, express much appreciation of this and of the kindness shown to them by the staffs. The report gives its opinion that the health of many old people, who may be living alone, has been much benefited by a good meal every weekday in comfortable conditions.

Few housewives or mothers with young children as yet frequent the restaurants. Only about 6 per cent. of the daily diners fall into this category; and this represents a small proportion of this section of the population. Very few of them, and indeed very few of the diners as a whole, seem to come to the restaurants purely in order to supplement their rations. At the same time the report shows that the dish most appreciated by the public is meat, although in several restaurants there is a growing taste for salad dishes.

What did these people do before the civic restaurants were opened? It was discovered that a large number of them used to have their meals at home; but a considerable proportion of these were women, who are now going out to work for the first time. About 27 per cent. of the diners used to lunch off sandwiches they brought with them; in fact, says the report, there must be at least 200,000 people in the country as a whole, who are now saved by the civic restaurants from the monotony of a carried lunch. Forty per cent. of the diners used formerly to lunch in commercial restaurants or cafés. Does this mean that private caterers are being deprived of their custom to this extent? In reply the report estimates that in some areas of London roughly 9 per cent. of private-catering establishments have closed since 1940; and thus at present, at any rate, the communal restaurants are probably doing little more than filling up the inevitable gap created by the war.

Are those who go to the British Restaurants a floating population or are they regular customers? The inquiry shows that a remarkably high proportion of them become absolutely regular customers, often as many as 80 or 90 per cent. The public is, says the report, obviously very loyal to the restaurant of its choice, despite whatever inconveniences there may be. It was found, for example, that the queue system was accepted by the diners, and on the whole they were satisfied with it, provided that the queue moved steadily towards its goal. When the diners were asked whether they would like the restaurants to continue after the war, practically all of them said yes, and one out of every seven was emphatic in his reply.

The statement has sometimes been made that the British Restaurants do not pay their way. This question has been thoroughly gone into in the report, which concludes with a detailed analysis statement of the costs of some thirty restaurants. In arriving at the costs the investigators made full allowance for all services at present received by the restaurants free of charge or at reduced rates. As a result, the cost figures show the position of each restaurant, assuming it was run entirely on a commercial basis. After a full examination of the situation the conclusion is reached that the one factor determining whether a restaurant pays or not is the turnover. When all the thirty restaurants were taken together they realised a favourable balance of between ¼d. and ½d. in every shilling turnover. But if the restaurants were taken individually, then it was clear that a restaurant of this kind should have an annual turnover of between £2,000 and £3,000 a year if it is not to make a loss, and, to be on the safe side, the turnover should be at least £3,000 annually.

* *The Communal Restaurant.* A Study of the Place of Civic Restaurants in the Life of the Community. London Council of Social Service. Pp. 36. London. 1943. 6d. (post free, 7½d.).

Use of Lard in Cake Making

As it has been necessary to increase the proportion of lard in the total allocation of fats to bakers, the Ministry of Food recommends the following method of preparing the lard, which greatly improves its creaming qualities:

Melt the lard to a liquid (without exceeding 110° F.) and cool quickly. Cooling is facilitated by stirring with the bowl standing in cold running water. Only prepare what can be used up in two or three days and store in a cool place.

Methods of Using

1. Cream and sugar for *5 minutes only* before adding the eggs.
2. Add ½ lb. of the weighed up flour at the creaming stage for every pound of lard used.
3. Use eggs as *cold* as possible.
4. Do not cream the batter once the eggs are incorporated.
5. Increase the baking powder by ½ oz. per 5 lbs. of flour.

The Future of the Filbert

This article records an address given by Dr. E. H. Wiegand at a meeting of the Oregon Nut Growers Association. Dr. Wiegand is the Head of the Food Industries Department, Oregon Agricultural Experiment Station, Corvallis, Oregon. The details given are of importance to British importers of nuts from Turkey and Italy after the war.

E. H. WIEGAND.

UP UNTIL the present time the filbert has taken the *rôle* of a favoured delicacy in this country. It may well be that the present world situation will be the factor which moves it from the rank of non-essential pastries and parties to the essential foods and plastics. Production in the Pacific north-west reached an all-time high in 1941 with a production total of 5,030 tons, for which the grower received 307 dollars a ton. In 1942 the total production was 4,570 tons and the price per ton was approximately 360 dollars. These production totals, however, do not equal the consumption of nuts before the war closed the door to import trade. In 1940 we imported about 3,600 tons of filberts on an unshelled basis. At that time this about equalled the domestic production. The majority of these nuts came from the Mediterranean area. Sixty-five per cent. of the shelled filberts used in the United States in 1936 came from Turkey. These were of a small variety and were used almost entirely by the confectioners' trade. The larger pointed Italian nut was used for table and salter purposes. The north-western grower has sold the bulk of his crop in the unshelled state. At the prevailing prices it is questionable whether the public will continue to be interested in the unshelled nut. It has not been considered a profitable practice to shell. The cost of that operation in this country has been so great as to make it difficult to compete with the cheap labour of the Mediterranean area. In Turkey, investigations show that a large part of the product is shelled in the homes, without the careful supervision and stringent State and Federal laws under which our produce must be packed.

New Future for the Filbert

Freed for the time from the imports which might threaten to create a definite surplus, and recognising the importance of certain needs and shortages, it would be well for the producer to consider a new future for his product. This may be his salvation when the orchards reach a maximum of production and imports again cause a surplus to develop.

Forty per cent. of the filbert weight is kernel. Of the kernel weight, 50 to 60 per cent. is oil. In this day and age any potential source of oil is important. The reasons for this are reviewed here.

In 1941, in spite of an outstanding production of nearly 9½ billions of pounds of fats and oils in the United States, we imported approximately 1 pound of fat and oil for every 5 pounds we produced. Our chief shortage in this country is in oils and fats of the drying type, and we have also imported many oils rich in lauric acid for the soap industry. In 1942 the war had reduced our imports by an even billion pounds. Coconut, tung and China wood oils were no longer available from Pacific areas; olive oil from the Mediterranean was also lost. Though most of the normal resources of vegetable and animal fats and oils have been increased, the national reserve is becoming steadily lower. Domestic production for 1943 is expected to be nearly 12 million pounds—yet regardless of the amount the farmer is able to produce there will not be enough fats and oils to supply the nation's needs. The vast quantities needed for smokeless powders, for home use, for the armed forces, and for fulfilment of our pledges to lend-lease will tax our production powers to the utmost. Not only are the needs great, but existing crushing facilities for production of raw oils are limited, refining facilities strained to the breaking point, and transportation problems a headache. Upon us, however are depending the Allies whose rations have been short for so long a time, and those countries which will be liberated from Axis powers and whose food resources have been drained into the homeland of the invaders since the time of their occupation.

New Resources for Industrial Oils and Fats

A committee of Chicago scientists and chemists has been formed whose purpose it is to uncover new resources for industrial fats and oils. Their plans include both promotion of new and improved methods of fats collection in dairies, in meat packing plants and margarine processing places, and the search for new sources of fats.

They are not pioneers in such a search. In preparation for the years when many of their normal sources of food would be closed, Dr. T. Saiki, director of nutrition in Tokyo, concentrated on the problem of finding new cheap food resources. Research workers and students were sent over the country to study everything edible, including weeds and insects. It is interesting to note that the silkworm, no longer of value for the export trade, is now a valuable source of vitamin B_1, which is found in the cocoon.

Americans not only fail to develop new food resources, but are extravagant in the use of the resources at hand. For instance, we are beginning to recognise the uses of peanut oil, but have failed to see the value of the meal residue, which is valuable as a source of proteins and certain vitamins and could be utilised to a greater extent than is now true.

This brings us back to the filbert and its part in the present situation. As was said, the kernel varies in oil content from 50 to 60 per cent. The composition of this oil is very similar to that of olive oil. The oil is not difficult to extract. Good results may be obtained

with the use of a hydraulic press, with a pressure of 2,000 pounds per square inch, upon nuts which have been chopped. The significance of this information is tremendous. Basing the possible 1943 yield upon that for the year 1941, 5,030 tons, unshelled, the shelled weight would approximate (40 × 5,030 × 2,000), or 4,024,000 pounds. This in turn, upon a very conservative estimate based upon a 50 per cent. production of oil, would yield some 2,012,000 pounds of oil, which is not an insignificant sum.

Chemical and Physical Properties

The chemical and physical properties of this oil are shown in Table 1.

TABLE 1.

Specific gravity (20/20° C.)	0·9144
Index of refraction (20° C.)	1·4698
Iodine number (Hanus)	84·70
Thiocyanogen number	84·04
Saponification number	191·12
Polenske number	0·57
Free fatty acids (per cent. oleic) ...	0·15
Acetylene number	2·65
Soluble acids (per cent. butyric) ...	trace
Insoluble acids (per cent. corrected)	95·44
Saturated acids (per cent. corrected)	90·97
Iodine number of unsaturated acids	89·70
Saponification number of unsaturated acids	192·10
Unsaponifiable matter	0·55

As compared with olive oil, we find these acids present in the amounts in Table 2.

TABLE 2.

	Filbert. *Per Cent.*	*Olive.* *Per Cent.*
Stearic	1·0	2·3
Palmitic	0·0	6·0
Oleic	85·0	84·0
Phytosterol	10·5	-
Arachidic	trace	0·1
Myristic	-	trace
Linolic		4·6

The results of this test indicate that the filbert occupies high rank as a source of pure oleic acid. There is a much higher proportion present in this oil than in olive, peanut, or almond oils, in which the amount of oleic acid present is from 55 to 60 per cent.

Oleic acid is colourless, solidifies when cold, melts at 14° C., and cannot be volatilised without decomposition. It is tasteless and odourless, but becomes yellow and has a rancid odour upon exposure to air. By use of a catalyst, such as nickel, it can be hydrolised to a saturated acid. It is the basis for most lard substitutes, and is also used as the base for many soaps, for oilcloth preparations, and for printers' inks.

Substitute for Olive Oil

It would seem from a study of the composition of filbert oil that it might be used in many of the products once dependent upon olive oil. Scientists agree in the statement that filbert oil is one of the best edible oils. Before the war more than 95 per cent. of the olive oil used in this country was imported from the Mediterranean area. Though cottonseed oil has long been a source of supplement to olive oil, its lack of food value has made it become considered an adulterant rather than otherwise. There is need for oil with food value as well as flavour. The soybean has recently been the chief source of such an oil. However, since soybean oil lends itself so readily to the manufacture of paint products and the making of smokeless powder, any oil which may release it from the food front will prove most acceptable.

Chemists have shown that, basically, fats and oils are alike in that each is a mixture of several oils, that it is possible to analyse a given oil, separate it into its component fractions, and recombine these fractions to reach the desired end. Such strides have been made in these fields during the past year that the paint industry has been able to survive what threatened to be certain failure, when the usual drying oils were no longer available.

Overcoming Rancidity

Until recently the unsaturated nature of filbert oil made it difficult to use as it became rancid easily. Literature published only a few years back indicated that the oil became rancid so quickly as to make it unsatisfactory for commercial use. Chemists have learned to overcome this difficulty, and now filbert oil may take its place without that danger. This method was perfected by Drs. Mitchell and Black, of Swift and Company, who have found that gum guaiac, from tropical American trees, is a good antioxidant. Judging from the olive-oil industry we may expect the cooking fat industry, the nut margarine makers, and the salad oil manufacturers to welcome so edible and palatable an oil for their use.

Filbert oil should also be useful to pharmacists as a base for laxatives, for liniments, and as a base for perfumes. That same unsaturated factor, mentioned before, gives it the property of absorbing and retaining odours. Like almond oil, which it closely resembles, it may well become the base for cosmetics.

Miscellaneous Uses for Filbert Oil

Such uses require the first and finer extractions of the oil. Second-class oils, produced by petroleum ether extraction or reapplication of pressure, would make a good quality of light lubricating oil, might replace olive oil in castile soaps, be used in the sardine-packing industry, or be used in the beef and sausage filler trade as a preservative. It might also supply the lubricant for the wool spinning and weaving industry. Nature provides the sheep with an abundant supply of natural oil which prevents matting of the many horny projections on each strand of wool. This natural oil is washed out in the cleansing process, and for successful handling of the material during the spinning and weaving processes, oil must be added. Olive oil has been used until now, when it is no longer available.

Previously the cost of producing filbert oil has prohibited its development. At the present time higher prices may make it worth while to install the necessary machinery. The shortage of fats and oils and their great importance on the food and munitions fronts

should give that machinery the necessary high priority rating.

In normal times 70 per cent. of the fats and oils produced in the United States are used in foods. Twenty per cent. more goes into the manufacture of soaps. There has been no slackening of the manufacture of soap until recently because of the very great need for the by-product of soap manufacture, glycerin. Ordinarily used for ointments and medicines, it is now in great demand for munitions manufacture. The War Production Board has announced curtailment of the quantity which may be used for civilian purposes.

Although filbert oil does not contain lauric acid, often considered necessary for soap manufacture, it is possible that the soap industry may learn to do without the 400 million pounds of lauric acid oils which have been imported every year. It has been demonstrated that soaps made only from oleic and palmitic oils are equal in detergency to conventional soaps containing lauric and stearic acids. Economically, however, wide use of filbert oils for soap will depend upon a less costly method of separating the small quantity of stearic acid from the palmitic and oleic acids present. No doubt if the need becomes great enough this research will be made.

Not only are household soaps made from vegetable fats, but also a product known as lead soap, which is used for lubrication of freight cars, for tool cutting, and for flotation of ores for important war metals.

Plastics

Still another field for vegetable oils is that of plastics. Developed after the first world war, dreamed into being in such laboratories as those of Henry Ford and of George Washington Carver, World War II with its tremendous demand for improved equipment has speeded research in every line. The first man to receive the John Wesley Hyatt award for the Advancement of Plastics, established by the Hercules Powder Company two years ago, was Dr. Don S. Fredrick, for his work in adapting plastics to the need of American aircraft. The exact formula has not been made public, but it is known that it contains a large proportion of vegetable oils. This plastic is the stuff from which the transparent, non-shattering nose and turret of the bombing planes are moulded.

The small quantity of stearic acid present may make the use of filbert oil unprofitable in the manufacture of synthetic rubber, though use of that fatty acid is one of the factors giving wearing quality to the product which may make natural latex out-dated.

High Cost of Oil

In making these statements of possibility for the future of filbert oil, the high cost of the oil is recognised. If the oil only were to be considered, at the price of 18 cents per pound, unshelled, the oil, anticipating 40 per cent. shelled weight, and a 50 per cent. production of oil, would have to cost about 80 cents per pound. It is expensive, but if proved valuable enough, and with a ceiling to be set, not met, it is possible.

Having considered some of the uses for the oil, it would be useful to look at the rest of the kernel, searching for possible uses. At the present time the peanut growers are advertising widely the high food content of their product. A comparison of the compositions of the filbert and the peanut is shown in Table 3.

TABLE 3.

	Filbert. *Per Cent. by Wgt.*	*Peanut.* *Per Cent. by Wgt.*
Protein	... 12·7	26·9
Carbohydrate ...	... 14·3	21·2
Fat	... 60·9	44·2
Crude fibre ...	... 3·4	2·4
Ash	... 2·7	2·7
Calcium	... 0·287	0·071
Phosphorus ...	... 0·354	0·399
	Mg. per kg.	*Mg. per kg.*
Iron	... 41	20
Copper	... 12	9·6
	Per 100 gm.	*Per 100 gm.*
Calories ...	... 656	590
	Per 100 gm.	*Per 100 gm.*
Vitamin A ...	... 440	360
,, B_1 ...	... 500	680
,, C ...	... —	—
,, B_2 ...	... good	good

Vitamin B tests show that a 20 per cent. filbert diet (with rats) is sufficient for maintenance.

Total caloric content for 14 grams of nuts was 92 for the filbert and 86 for the peanut. In fully developed filberts there are only sparsely occurring grains of starch. There are 12 mg. of copper per kg. in the kernel, and 10·3 mg. per kg. of zinc.

The high protein and carbohydrate content of the nut indicates a source of proteins for the diet to replace the decreasing supply of meat, eggs, and milk.

Oil Cake for Nut Bread

The cake remaining after the removal of the oil can be ground into flour which, among other uses, makes a fine flavoured nut bread. It should be used in combination with other flours, as using filbert flour alone the bread is somewhat heavy. It is interesting to note that Turkey, no longer able to import lighter grain flours, is using the flour of the filberts she can no longer export for her breads. The kernel of the walnut has been used for some time as a basis for cattle feed. Since the food value of the filbert is comparable with that of the walnut (*protein*: filbert, 12·7, English walnut, 15·0; *carbohydrates*: filbert, 14·3, English walnut, 13·5; *vitamin A*, 4·4 as compared with 1·3; vitamin B_1, 5·0 as compared with 1·4) the filbert meal should be of better value than walnut meal for this purpose. Use of the meal for human consumption requires more careful handling than otherwise. Pure ether rather than petroleum ether extraction is necessary because of the disagreeable odours resultant from the latter, but the cost should not be prohibitive.

Possibly of lesser value at this time, but worth investigation, should we use the filbert for oil and meal, is the hull. Last year there was a potential of something over 2,500 tons of shells. Actually there were only 551 tons resultant from shelling of nuts. As yet,

few experiments have been made with filbert shells. The walnut growers have done some work with their shells. From their findings we may develop some ideas of what things are possible. Charcoal seems to be one of the first uses to which these products may be put. Much of the walnut charcoal has been sold to poultry producers, while other quantities have been used as filtrant for high-grade vinegar. At present there is a great demand for charcoal for gas masks and other war uses. For the duration there would be ready market for all produced.

Filbert shells may be ground into a fine flour. Completely freed from the kernel, the shell can be put through a Wiley mill until it will pass through a 60-mesh sieve. Grinding the flour requires special machinery—intricate and expensive—for the prevention of explosions. Like many others, this dust is highly explosive and any small spark entering the grinding machine may set it off.

Uses for Shell

Uses of this flour have been varied. Fifty-two per cent. cellulose, it may be used in moulding resin forms. The high cutin content reduces resin absorption which, while it reduces tensile and compressive strength, does not necessarily impair the flectural and impact resistance. An exceptionally smooth glassy finish is possible.

A practical floor covering has been developed, using a water-insoluble aluminium or zinc salt of the higher fatty acids, fine wood powder, pigment, and resinous materials. They are applied to a flexible base, and the whole covered with colouring and binding materials to fill any pores which might be left.

Considerable tonnage of wood powders—or flours—is used for the manufacture of battery cases and the making of synthetic glues for plywood. It makes a very fine glue for this purpose and would find ready disposal in the Willamette Valley.

Other possibilities include its use in insecticides as a spreader, or as a filler for the insecticides which are used in the fur-cleaning industries. A radio horn made from walnut shell flour has proven to be particularly acceptable, since it seems to filter out vibrations more effectively than other materials used in loud speakers.

Twenty-nine per cent. of the shell's composition is lignin. Until recently there has been little known use for this substance, but chemists are beginning to believe it has unexpected qualities. At the present time extensive tests are being made for the development of a derivative to be used for anti-knock purposes in aviation gasoline.

Dyes from Shell ?

Still another possibility is the development of dyes from the shell. Colour in the shell is water soluble, likewise soluble in alcohol, amalac, ether or benzene. This colour in combination with different chemicals produces dyes of different hues. For example, the colour extract with copper sulphate or with concentrated nitric acid gives yellow. With ammonia the colour is ruby red. Use of iron sulphate produces olive green. Recent experiments have been made in an attempt to make yellow and brown dyes from the filbert nut on a commercial scale. Results of these tests are not immediately available.

How much of the development suggested here will be possible at the present time is difficult to say. Possibly much would depend upon the growers' ability to convince the War Production Board of the ultimate value of his product to the war effort. Presented with convincing argument, and with detailed facts and figures, he may be able to secure a high enough priority rating to secure machinery.

This, briefly, outlines some of the ways in which the filbert might be used. The problem now is to determine with what profit such handling might be developed. As long as the present price level for the unshelled product is maintained, there is little likelihood of change being made in the handling of filberts. However, there is an expressed feeling on the part of many growers that higher prices and increased production, which may be expected, will create a surplus. In this event, either the market will be broken down or derivatives must be stimulated. It is quite likely that such a surplus will be instrumental in the creation of a market for by-products. It may be that the grower will feel he can afford to instal equipment rather than allow a surplus to accumulate. There will always be a certain amount of demand for raw materials, and the plan which seems most logical should be to develop a major outlet for surpluses which will naturally occur, rather than which would utilise the entire crop.

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Army Food

A short account indicating the extent of the planning, research and development of food matters in the U.S A. Army.

COL. PAUL P. LOGAN.

PROVIDING food for an Army of 7 million men is indeed a gigantic task. Measured in terms of dollar volume or tonnage, it reaches beyond the scope of ordinary imagination. Expenditures now average more than 4 million dollars daily, and since a soldier eats about five pounds of food per day there must be daily purchased, inspected, shipped, stored, issued and accounted for more than 30 million pounds of food.

Shortage of transportation and scarcity of critical packaging materials has focused research and development on the fields of condensed and concentrated foods and on fibre packages. Results have been amazing.

The extent of the planning and of the research and development work required by the circumstances of Army operation can be better visualised when it is realised that food must be made available to the Army in regions of almost every known type of climate in the world—the temperate zone, the steaming jungle, the dry, burning desert, the frigid climate of the Arctic, the rarefied atmosphere of high altitudes in mountainous regions, and the regions of extremely heavy rainfall. The food used in each of these localities must be suitable to the locality and so packed as to remain in a well-preserved condition until it is consumed.

Pipe Line of Supply

The line of supply which extends from the factory in the United States to the front line in North Africa is sometimes called the " pipe line of supply ". Along this fine storage reservoirs in the form of advance, intermediate and base depots must be constantly filled with a specified number of days' level of rations in order to insure a continuous and uninterrupted flow of food to the battlefield. In some cases the quantity of supplies required to fill the pipe line is as much as nine months or 270 days' level. In all cases the oldest supplies are being delivered from the foremost depots in the field. Because of this, great importance must be attached to the keeping quality of each food item. All must be tested for storage life under the most adverse of climatic conditions. For several known and many unknown reasons, our experience indicates that hardly any processed food will remain completely stable at temperatures of 130° F. or above. Our pre-war concept of food stability has been radically changed, due to experiences in the South Pacific and in North Africa.

Quick-Frozen Foods

Quick-frozen foods, being devoid of waste and packaged in non-critical containers, offered a most practical and useful means of providing perishables to Army posts where proper storage facilities had been installed. This year the Army will consume not less than 70 million pounds of frozen vegetables, all of which will be obtained from plants expanded during 1942 to meet the Army requirements. This expansion programme was undertaken in order that the facilities which had previously existed would continue to provide the usual quantity of frozen products for the civilian market.

It is interesting to note that if the quantity of frozen vegetables which is being procured by the Army this year were to be canned, it would require approximately 18 million pounds of steel and more than 220,000 pounds of tin for containers, and, further, that if these products were purchased in fresh form they would require almost 10,000 railroad cars for shipment, whereas the frozen product will be transported in less than 3,000 cars. It is believed that the impetus given to the frozen food industry by wartime procurement will successfully establish it for post-war activity as a standard and normal method of preserving foods for commercial distribution.

Special Rations

A number of special rations have been developed for use under special conditions where perishable foods cannot be obtained and where time and opportunity for cooking meals are not available. These include a canned ration carried by the individual as a reserve, a boxed ration carried by the individual originally developed for parachute troops. The canned ration has been used extensively in every theatre of operation. It is officially known as the Type C Field Ration. The boxed ration was and is being extensively used in Africa, and it is officially designated as the Field Ration K. Another standard ration is Field Ration D, which is a highly concentrated emergency ration, consisting entirely of stabilised chocolate. It is intended for use only when all other forms of food cease to be available. We have also developed rations for life rafts, both rafts that are used on vessels and the inflated rubber raft that is used on aircraft. Combat lunches have been developed for bomber crews and special duty rations have been developed for temporary use in jungle, mountain and desert warfare. The most recent development is the 10-in-1 Ration.

This ration, packed in one box, provides a balanced diet for ten men for one day. Each box contains a menu explaining the components designed for each meal. The purpose of this assembled ration is to facilitate distribution under battle conditions. The components of the ration are of such nature that they can be eaten cold, if necessary, with the addition of water to certain of the items, such as soluble coffee. If opportunity permits, the ration can be made more palatable by being warmed.

New food products are constantly being received by the Quartermaster Corps and investigated by the Re-

An abstract of an address by Colonel Paul P. Logan, of the United States Quartermaster Corps, given at a general session of the American Chemical Society at its 106th meeting in Pittsburgh, September 8, 1943.

search and Development Branch, Subsistence Research Laboratory and the Subsistence Branch. Final consideration is given to products which appear to have merit by the Subsistence Test Panel of the Office of the Quartermaster General. Special attention is paid to products which may be used in one of the special rations or which are considered better adapted for field use than certain of the items now being purchased. For example, at the present time consideration is being given to new varieties of meat components and new forms of biscuits for the individual reserve rations C and K. The manufacture of orange powder by means of a modification of the high vacuum process used for drying blood plasma is receiving special attention. The concentration of vinegar by a method which freezes out the water makes it possible to conserve shipping space. Vanilla and maple flavours are now in tablet form in lieu of liquid extract. Lemon tablets are under development. For months the Army has been using a stabilized butter in overseas tropical stations. Two types have been developed, one in which the stabilisation is brought about by the inclusion of hydrogenated vegetable oil, and the other by the addition of cheese and milk solids.

In this, the most terrible of all wars, every man, woman and child is participating. No one can escape that participation regardless of what they think or do. There is an increasing apparent consciousness in America on the importance of food in our daily lives. We are learning that health and vigour can be maintained without many of the varieties and high-priced foods to which we were formerly accustomed. We are learning from the famine-ridden countries under Axis control that no terror is greater than the spectre of starvation. We know that it must be our mission, as we liberate these countries, to feed the starving people and through food to restore to them life and hope. We have before us a grave responsibility and wonderful opportunity of leading the way and contributing, through scientific food knowledge and material assistance, the strongest possible element for a lasting peace —namely, the absence of fear of hunger. America is equal to the task and its citizens will be thankful they lived to assist in its accomplishment.

Food Research Stations in 1942

Despite shortages of laboratory staff and other factors, British food research is still marching on and a large volume of valuable work in 1942 has been recorded. This article records briefly a selection of the work performed at three well-known research stations.*

THE ANNUAL report from Campden shows another useful year of work, despite the fact that the activities of the members of the staff throughout the year have been largely dominated by the various influences of the war. As is stated by Mr. F. Hirst, Director of the Station, there are certain aspects of the work which, in the national interest, cannot be published in detail. One of these concerns the experiments on the substitution of blackplate for tinplate in food cans, upon which a considerable amount of work has been performed. This work is touched upon briefly.

Use of Blackplate for Cans

The possibility of the substitution of blackplate ends for tinplate ends has received a very thorough examination, and the results have been made known to the Ministry of Food. Some idea of the design and scope of the experiments is given. The tests were planned with a view to establishing conditions which would result in the least possible corrosion of the container or deterioration of the contents, while taking into account the practical difficulties of the can-maker.

The first series of experiments was started early in 1942, the vegetables tested being processed peas, beans in tomato sauce, carrots, beetroot, parsnips, swedes and beans in brine. The can factors examined were the type of plate used (hot-dipped and cold-rolled) and the type and method of application of the lacquer. A sulphur-resisting and a "meat" lacquer were used, either as a single roller-coating or as a roller-coating followed by a dipped-coating. Some of these cans were stored at a constant temperature of 35° C. and some at normal room temperatures. The fall in vacuum of the cans stored at the constant temperature was recorded on blocks of cans month by month, the method used being the measurement of the change in depression of the ends as recorded by spherometer readings. This method has given excellent results, and curves have been obtained which clearly indicate the effect of the factors tested on the rate of corrosion.

A second series of tests were started a few months later on cans with blackplate ends with double roller-coatings of the same two lacquers and on cans with "bonderised" blackplate ends. Similar technique was used throughout, and interesting results were again recorded.

After these experiments had indicated the most practical type of blackplate end for general use, a further series of tests was put in hand to show the amount of variation in corrosive properties of each of the commoner vegetables when packed in this type of can.

Cans with blackplate ends lacquered with colour and dipped coatings and others with "bonderised" blackplate ends were tested during the summer months with all the principal fruits, and valuable results were obtained. A few experiments were conducted on cans made entirely of blackplate.

Vitamin C Content of Canned Fruit and Vegetables

The second progress report by W. B. Adam follows that of last year in which the author gave the results of experiments designed to show the effect of several

* Fruit and Vegetable Preservation Research Station, Campden, Annual Report, 1942; Rep. Exp. Res. Sta., Cheshunt, 1942; East Malling Research Station, Annual Report, 1942.

factors on the loss of Vitamin C in canned fruit and vegetables. The factors dealt with were: (*a*) volume of head space; (*b*) lacquering; (*c*) time and temperature of processing, and (*d*) time of storage.

The factors studied did not take into consideration all the possible stages at which loss of vitamin C might occur during and after the canning operations, and the work was extended in 1942 to cover most of the factors which remained untouched, or which merited further study. These included the effect of (*a*) holding the fruit or vegetables after preparation (*e.g.*, snibbing, shelling, slicing, etc.); (*b*) holding vegetables after blanching and before canning; (*c*) temperature of closure of the cans; (*d*) further tests on the time of storage. It is pointed out in the report that the work is not complete (time of storage, for instance, will be extended to include one year), but the results already obtained are of sufficient interest to justify publication in their present state.

The experimental methods are described in full. The vitamin C content was determined on the solid and liquid portions by titration with 2:6 dichlorophenol-indophenol. Analyses for total reduced vitamin C (including the reversibly oxidised form, dehydro-ascorbic acid) were made by the method recommended by Harris and Olliver (*Biochem. J.*, 1942, **36**, 155).

Canning Line Delays

Unavoidable stoppages of the running of a canning line sometimes occur, and this may be of fairly long duration. Similar delays may happen where the fruit or vegetable is placed in the cans and the filled cans stacked for some hours before the line is set in operation. The effect of this holding of materials has been studied and the loss of vitamin C tabulated for a number of products.

Another set of experiments were made to test the effect of holding vegetables after blanching, and figures obtained indicate that an appreciable loss of vitamin C occurs, particularly during the earlier stages of holding.

Previous experiments have shown that the volume of the head space has an important bearing on the loss of vitamin C in canned fruit and vegetables. When the volume of head space is kept constant the rate of loss might have been expected to vary with the closing temperature—*i.e.*, with the partial pressure of the oxygen, but this was shown to be a factor of no great significance. The effect of time of storage on canned vegetables and fruits was also studied.

Determination of Minute Amounts of Boron

A paper by Denis Dickinson describes the technique of the chemical determination of minute amounts of boron.

The conclusion come to is that the quinalizarin reaction is quite a good method, and considerable time may be saved by using alkaline solutions of phenolphthalein and thymolphthalein to match the colours, thus eliminating the preparation of rather troublesome standards. The colour is not an easy one to match, however, and the personal factor is of first importance.

The use of alizarin-S in place of quinalizarin offers several advantages. In the first place the colour change is such that it can be matched by a single solution, methyl-orange, as the depth of the column of solution required to match the colour produced by alizarin-S and boron is a direct measure of the amount of boron present. Secondly, the colour is so much less intense and so much easier to match that the personal factor is almost eliminated, and the results are more nearly reproducible.

Much of the material included in this paper has already appeared in *The Analyst*, 1942, **68**, 106.

Fruit Gumming of Victoria Plums

The fourth progress report on Fruit Gumming of Victoria Plums is presented by W. B. Adam and D. Dickinson. The findings of the authors are summarised as follows:

(1) The treatment of soil under plum trees with four or five ounces of borax in April does not materially reduce the gumming of the crop that season or the next, though a small additional amount of boron (two to four parts per million on dry weight) is taken up by the leaves, fruit and stones.

(2) The weight of the crop and the size of the plums do not appear to be factors of importance.

(3) The rainfall in the latter part of the growing period (July and August) is positively correlated with the degree of gumming. Further experiments designed to check the conclusions from statistical evidence will be made as soon as possible.

Solids and Sugars in Canned Beans

Some notes on the determination of solids and sugars in canned beans by W. B. Adam and D. Dickinson give a brief summary of the work done on this subject at Campden. The introduction of official minimum standards for the content of total solids and sugars in canned beans in tomato sauce made it necessary to examine the methods of determining these two constituents.

Alternative methods for the determination of total solids and sugars were examined and full details are given. A modification of the procedure of the Association of Official Agricultural Chemists for determining sugars in stock feeds was finally recommended and its precision recorded.

EAST MALLING RESEARCH STATION

The voluminous report for 1942 of the East Malling Research Station is divided into four sections: (1) the experimental farm, (2) general review of research work with list of papers published during the year, (3) research reports, (4) bulletins for fruit growers.

Section (1) gives details of the work in experimental orchards and nurseries. The routine spraying programme closely followed that recommended in the 1942 Spraying Calendar with modifications as necessary. In the general review of research work figure papers by R. G. Hatton and W. S. Rogers on pomology; statistics and records by T. N. Hoblyn; plant physiology by M. C. Vyvian; Biochemistry by W. A. Roach and B. D. Bolas; plant pathology by R. V. Harris; entomology by A. M. Massee; insecticides and fungicides by H. B. S. Montgomery, M. H. Moore, H. Shaw and W. Steer; and hops by F. H. Beard.

Among the research reports is a description of five new raspberry seedlings by N. H. Grubb.

Notes on some interesting insects observed in 1942 are given by A. M. Massee, and 22 species are described.

The copper supply situation in recent years has made

it imperative that no opportunity should be overlooked of finding an effective alternative fungicide, particularly for use on potatoes. Among other substances the organo-mercury compounds have attracted attention. H. B. S. Montgomery and H. Shaw in a paper entitled " Field Trials of phenyl-mercury-chloride for the control of potato blight " state that at first sight the prospect is perhaps somewhat extravagant, but if a form of mercury could be found having a potency of at least 100 times that of copper in Bordeaux mixture it could compete in price with copper preparations. Laboratory tests against spores of *Venturia inaequalis* had revealed the very high toxicity of several organo-mercurials and among those phenyl mercury chloride was outstanding. The conclusion arrived at, however, was that concentrations of phenyl mercury chloride up to 0·0025 per cent. failed to give appreciable control of potato blight on the variety British Queen grown at East Malling in the season 1941-1942. In each year the attack of blight came late, and Bordeaux spraying, though protecting the foliage against attack, did not result in a significant increase in yield over unsprayed plots.

An account is given by F. H. Beard on the common varieties of hops, and constitutes a preliminary comparison of their chief characteristics at East Malling.

Section 4—bulletins for fruit growers—contains eight papers on the subject.

Full references are given, and reviews and lists of research papers published during the year will be useful for those concerned.

EXPERIMENTAL AND RESEARCH STATION, CHESHUNT

The station at Cheshunt has recently published its twenty-eighth annual report for 1942.

Under the title " Experimental Results in 1942 " are described experiments on tomatoes, lettuce and carrots.

Under " Plant Diseases " figure papers by various authors, all concerned with tomatoes. During 1942 work has been directed mainly upon tomato Mosaic virus disease, which remains one of the most serious and widespread of this group of diseases affecting the yield and quality of the tomato crop under glass. I. W. Selman, in a paper on the subject, states that two aspects of the problem have been studied, firstly by investigation of the appearance and spread of the disease in commercial houses under various conditions, and secondly by studying the environmental factors which affect the yield and fruit quality of diseased plants. To approach the problem of the production of mosaic-free crop there are two main points: (1) control of sources of infection, and (2) control of culture. Details of the main methods of control are given.

A practical paper by H. W. Read on Fungicides for the control of " late blight " (*Phytophthora infestans*) on Tomatoes discusses the different fungicides used and the strength at which they are applied and the results obtained by the use of the different fungicides.

Another section is concerned with animal pests, and papers on eelworms, red spider mite and wireworm, and tomato leaf miner are presented.

Some interesting notes of chemical problems are given by O. Owen, and some notes on the rôle of trace elements in tomato production are discussed.

An appendix gives a useful list of publications covering the years 1919-1942.

Frustrated Contracts

THE Law Reform (Frustrated Contracts) Act, 1943, a measure important to industry, concerns the frustration of contracts, meaning where circumstances have intervened so that the contract cannot be fulfilled by reasons outside the power of either party to the contract, and has arisen from a comparatively recent House of Lords law decision.

The position has been that where a contract with payment to be made on the completion of the contract has been frustrated, although work has been done or goods supplied, no payment need be made until said completion, yet with " frustration " occurring this may never happen. By this new Act, if any person has received valuable benefit, payment shall be made up to the time of frustration for work done or goods supplied, but consideration is to be given to any expenses incurred by the person concerned, and also regard must be had to the circumstances which have caused the frustration.

Another provision concerns the position where money has been paid on account of the contract; until now this money had to be returned, although the person receiving the payment may have incurred certain expenses, in pursuance of the contract, as, for instance, preliminary steps taken, materials obtained, goods supplied, and so forth. Now, ordinarily the cash received must be returned, but it is allowable to deduct (or recover) a reasonable sum for whatever has been done towards undertaking the contract.

In connection with the amount which can be taken into account for expenses, for the purpose of this Act, an amount can be included for overhead expenses and for any work done or services performed personally by the particular person, this applying to a person in the position of either buyer or seller.

If any money is to be received through a contract of insurance, designed to meet the possibility of " frustration ", no account is to be taken of any sum so receivable, unless the frustrated contract included an obligation to so insure, or insurance was required under any enactment.

It should be understood that, although this Act lays down the legal position as regards " frustration ", there is nothing to prevent agreements being made to cover any circumstances which might cause " frustration " to occur; that, of course, is a question for the persons making the contract.

A point to note is that the foregoing provisions of this Act, the Law Reform (Frustrated Contracts) Act, 1943, do not apply to any contract to which Section 7 of the Sale of Goods Act, 1893, applies, or to any other contract for the sale or for the sale and delivery of specific goods, where the contract is frustrated by reason of the fact that the goods have perished. The said Section 7 of the 1893 Act (which Act relates to the sale of goods generally) avoids contracts for the sale of specific goods which perish before the risk has passed to the buyer, the exact words of that Section 7 being: " Where there is an agreement to sell specific goods, and subsequently the goods, without any fault on the part of the seller or buyer, perish before the risk passes to the buyer, the agreement is thereby avoided. . . ." The term "specific goods " in this connection means " goods identified and agreed upon at the time a contract of sale is made ".

Food and the People

NUMBER three of the series *Target for Tomorrow* is a small book* by Sir John Orr.

The questions: What is being planned? What can be achieved?—referring to the building of a post-war world—give the necessary clue to the objects of the series.

Planners are Busy

Planners are busy, but they alone cannot build the new world. This is a task in which every citizen must take a hand. We believe, state the Editorial Board, consisting of Sir William Beveridge, Dr. Julian S. Huxley and Sir John Boyd Orr, that people want to know and to understand the plans and possibilities before us.

Sir John Orr's contribution is a very attractive one, written in plain language and copiously illustrated by pictures intended to ram home the lesson desired to be taught.

Food Requirements

The chapter on food requirements gives an excellent bird's-eye view of modern ideas on dietary standards, food legislation, etc.

In another chapter are traced the changes in the national dietary in the past two hundred years. A reproduction of Drummond's table shows the superiority of an English labourer's diet, before the industrial revolution, in terms of calcium, iron, vitamins A, B, and C, and also the serious deficiencies in the diet of families spending less than 9s. per week on food in 1935. However, by means of school meals, milk schemes and free issue of vitamin concentrates and the general rise in the standard of living matters improved, as shown by the two diagrams which compare the expectation of life at different ages, average height and incidence of rickets in children in industrial areas in 1913 and 1939.

Six useful sets of curves are reproduced from Orr and Lubbock's book, *Feeding the People in War-time*. These separate the population into six groups, according to average food expenditure per head, and two sets show average intake of minerals, vitamins, calories, protein and fat, expressed as percentages of standard requirements.

In discussing the cause of malnutrition, Sir John declares that we must not go back on the present food policy now in action, and based on the nutritional needs of the people.

Plans and Reports

Account is given of the plans and reports put forward from about 1930. Among the matters analysed are: Food, Health and Income (Rowett Institute); the Scottish Committee's recommendations; the League of Nations Committee on Food, 1935; the Astor-Rowntree Report, 1938; the Labour Party's food policy outlined in the resolution carried unanimously at the Party Conference in 1942; the Interim Report on Food Production Policy of the National Farmers Union, 1943; Conservative Party—First Interim Report of the Sub-Committee on Agriculture, 1943; Group of Peers Memorandum on Post-War Agricultural Policy, 1943; and finally the Recommendations of the World Food Conference of May-June, 1943, which overshadowed in importance those of all the previous committees.

Conflict of Interests

The recommendations made in the reports reveal a conflict of interests. Farmers want the power to control food-production to ensure that they will get a good price. Those interested in the health and physique of the people want production increased to provide for the nutritional needs of the whole population and retail prices so low that every family can buy sufficient for its needs. The food processors and distributors want as big a share of the retail price as they can get. It is a remarkable fact that all these apparently conflicting interests were, to some extent, served in the pre-war decade. Comparing 1939 with 1929, farmers got better prices; the poorer people were better fed; and the dividends of the food processors and distributors showed that these businesses did pretty well.

Consumption Levels

A short précis of the report of the section dealing with consumption levels and requirements is given.

Sir John admits that "since people who think, or at least hope, that things after the war will be pretty much as they were before, will say that the recommendations of the World Food Conference are merely the outcome of an exuberant idealism, which has arisen under the emotional stress of war, and will pass into oblivion after the war, as did the talk of reform during the last war". He points out that this kind of statement, made with an air of great practical experience and wisdom, is the most insidious and dangerous form of opposition. It tends to damp the enthusiasm of people of little faith, and silences timid people who cannot bear to be classed as silly idealists without knowledge of the economic or political considerations which these "practical" people assume they alone can understand. And so this line of argument represses the strong, well-informed public opinion which will be needed to carry the recommendations into practice. But, in fact, any intelligent person who will take the trouble to think for himself can weigh the arguments for or against the recommendations.

The final chapter deals with A Practical Target for Britain in the framework of a World Food Policy. In this is discussed the targets for health, agriculture, industry, trade, international co-operation, and organisation. For lack of space the temptation freely to quote must be resisted. Suffice to say that by reason of its clarity of exposition the book may be easily understood by the layman and should be read by every person who wishes to understand the plans and possibilities before us, and, as Sir John says, to take a hand in the planning.

* *Food and the People*. By Sir John Boyd Orr. Target for Tomorrow, No. 3. Pp. 56. 3s. 6d. net.

Soil and Sense

THE REPORT* of a conference organised by the Education Society (President, Lord Horder) for "the exchange of up-to-date knowledge on the production of organic fertilisers and the better cultivation of allotments and gardens—with a paper on soil-less culture", has just been published. The contents of the bag are very mixed. This alone makes the report unusual, for it is rare to find "real" scientists—that is, those who have a highly developed critical bent and do not suit their observational results to their beliefs—speaking from the same platform as the mystical believers in compost-for-its-own-sake. Some of the latter elevate animal manure to almost the status of a sacrament, and proceed by faith not merely in believing that there is salvation in compost, but that artificial manures (*chemicals*, my dear—isn't it *awful*?) are the works of the devil. So when we find Dr. R. H. Stoughton, Professor of Horticulture in the University of Reading, and Dr. A. H. Lewis, who is attached to Imperial Chemical Industries, Limited, sponsoring the use of artificials at the same conference as that at which Lady Eve Balfour (author of the recent propaganda book *The Living Soil*) gives a paper on "How I make compost"—to say nothing of one or two people who deal much more in faith and less in works than does Lady Eve—we realise that it is time to take notice.

Marrying Town Refuse and Sewage Sludge

Inspection shows that the sample is indeed representative; for in between the extremes there are a few hard-headed engineers and the like to tell how they perform the practical function of marrying town refuse and sewage sludge into a quite useful manure. The series of photographs showing how this is done is instructive.

Not all of the reasoning adduced by the engineers is sound. It is, for example, not justified to raise a scare about an eventual shortage of phosphates while there remain in the Rocky Mountains untouched supplies vaster than any yet worked; but at least the civil engineers have done something, even if their theory is a bit shaky at times.

Professor Stoughton has provided an excellent account of the aims, practice, and scope of "hydroponics" or soil-less cultivation, with special reference to vegetables. He points out that under this system soil-borne diseases (of plants) are unknown. Dr. Lewis's paper is on the use and distribution of mineral and artificial fertiliser, and seems to have stimulated a keener discussion. The advocates of organic manure *per se* asked a number of awkward questions about how the flavour and nutritive values of vegetables grown with artificials compared with those of vegetables grown with compost and organic manures. Here the scientists undoubtedly came off second-best: maybe not because they had a bad case at bottom, but because they had hardly any facts, and had to look down their noses and admit that there was practically no information from the scientific camp about the effects of artificials on the quality of vegetables or the numbers of earthworms.

The compost phalanx had no doubts, and advanced solidly with various assertions. The point is not that the "organic" advocates testify from faith: why should they not do so? It is nevertheless surprising that the big industries of food and agriculture have never thought it worth while to investigate properly the relation between agriculture and food. The field is thus left open to mysticism, since the wildest assertion can scarcely be contradicted. This state is surely itself unhealthy. However, it may be that the insistence on the virtues of organic manures will goad the authorities who control scientific research into getting some research done on what is really one of the most important questions of our time. Then, those whom I regard as logically the weaker vessels will have performed good service, even though (as I believe they will) they crash when it is done.

The paper which most appealed to me is by Miss Brenda Colvin on soil salvage, or the preservation of topsoil. This is a neglected subject which at first sight does not appear to have much to do with food. Miss Colvin points out the foolishness of covering fertile land (*e.g.*, market-gardens), with roads and buildings in the development of housing estates; and why is subsoil from foundations used to cover up garden soil? She does not mention that soil salvage—the transport of good topsoil from a building site to an agricultural holding—is standard practice in Malta. The matter raised by Miss Colvin is more far-reaching than she makes it seem in her paper; for it involves questions of freight and passenger transport of considerable complexity: they are, of course, not insoluble, but it is not likely that they will be solved by existing housing and planning authorities, who have shown themselves incapable of thinking of more than one thing at a time.

I should like to commend this report to all interested in the agricultural and horticultural aspects of food. It is unique in presenting several important but conflicting current points of view within small compass. The "biodynamic" and related schools of people who believe wholly in compost with or without invocations and magical essences of almost infinite dilution, but in any case without ch———ls, are gaining supporters, not least among farmers; and it behoves the unbeliever to learn the sort of arguments and the type of dogma he will encounter; besides which, it may be good for him to realise that there is a large public which is not merely interested in the question of the healthfulness of foods, but is propagating it as a matter of faith. Against this, the scientists are doing nothing relevant: the published experiments about the effect of manuring upon food quality are lopsided and of little worth.

The defect of the report is its proof-reading: phosphorous, M.Inst.Cy.E., granula, and twice Dx. for Dr. The Hon. Editor (a journalist) seems to have acted only as convener. Obviously neither an engineer nor a scientist is responsible for failing to correct the weaknesses in the contributors' spelling and for the other blunders. However ungallant the suggestion, the moral is that if you must indulge in scientific jargon, get a scientist to vet it.

H. N.

* *Soil and Methods of Increasing its Fertility*. London. 1943. Pp. 72+plates. 5s.

Correspondence

Distribution of Vacua in Cans

TO THE EDITOR OF FOOD MANUFACTURE

SIR,—The article by Mr. George W. Blackwood, of the Dewey and Almy Chemical Company, in your issue of October, pages 325-328, is not one upon which I can comment from the engineering point of view, but I feel that I may be able to offer a few helpful suggestions regarding the presentation of the numerical results.

The information in Charts 1 and 2 seems to be of doubtful utility except in so far as Chart 2 gives a distribution of the 20 cans damaged by abusive handling. Chart 1 gives the distribution of inches of vacuum in the thousand cans subjected to normal handling, while Chart 2 gives the distribution of vacuum in 980 non-defective, roughly treated cans as well as that in the 20 defective cans. Information regarding the cans having a vacuum of 10 inches or more provides little if any help about the problem of abusive treatment. Indeed, a superficial observer might conclude that the abusive handling had rather improved the distribution of the vacua of the 980 cans which survived the abuse: the median has been improved from 350 with normal handling to 360 after abusive handling. The same superficial observer might also think that the 20 defective cans represented samples thus "weeded-out" from the cans having the lower vacua, since there seem to be in Chart 2 rather fewer cans with vacua of from 10 to 16 inches than there are in Chart 1. These conclusions are, of course, highly unreliable, and are merely put forward to suggest the need for a reliable method of interpreting distributional data, so as to make results unambiguously comprehensible and useful.

I note that Mr. Blackwood says: "As the cans issued from the double seamer, one-half were placed in one retort crate and the other half in a second retort crate. Great care was taken to alternate every other can to each crate, so that there would be a truly representative grouping."

From the theoretical aspect of experimental design this "great care" is a mistake. Systematic arrangements, such as this arrangement of alternate cans, are rather liable to introduce systematic or periodic errors, and are therefore to be avoided. If the seamer was operating with perfect uniformity, probably no harm would be done, but there may have been some earlier lack of uniformity deriving from, say, irregular sizes of tinplate fed into the can-making machine, or other technical sources of error, about which Mr. Blackwood knows much more than I do. If such systematic errors were present they might coincide with the systematic selection of cans in such a way as to influence the validity of subsequent tests.

The only safeguard against such errors in a comparison of two or more samples is to introduce randomisation. This might be done by the actual physical tossing of a coin. To any suggestion that a research worker should engage in tossing a coin in the seaming establishment, a manufacturer might reply that it would be too likely to produce hilarious results amongst the workpeople and might even tend to corrupt their morals. There are, however, less obtrusive ways of securing randomisation, but in this imperfect world randomisation is an essential preliminary to the making of such tests as those which Chart 1 and Chart 2 represent, if an approach to validity is to be obtained.

Mr. Blackwood says further: "In answer to the query as to why the vacua ran as low as 10 inches in Chart 1, we can only say that this amount of variation is considered normal, and follows the theoretical frequency curve when the effect of" [certain] "variables is considered." I am unable to follow Mr. Blackwood on this point. I suggest that there is no such thing as a theoretical frequency curve for degrees of vacuum in cans; and if there were an ideal curve it is very doubtful whether theoretical considerations would enable anyone to predict the effect, on the shape of the curve, of variables introduced in processing. I think that what Mr. Blackwood means is that the curve of vacua in a large sample of cans approximates to the distribution shown in Chart 1 for a thousand cans and Chart 2 for 980 cans, and that something like either or both charts represents the general distribution of vacua in normal processed cans. He is quite right to point out that no surprise need be excited by the fact that processed cans show a wide range of vacua, such as from 10 to 22 inches.

It is a question whether the distribution of the vacua in the 980 cans on Chart 2 differs significantly from that of the thousand cans in Chart 1. This could be settled by statistical analysis if the two samples were random. Assuming that no serious error has been introduced by the lack of randomisation, a rough measure of the dispersion could be obtained by calculating the mean and standard deviation for the samples; the mean and standard deviation are fully characteristic of curves having a normal distribution. The distributions in Charts 1 and 2 are not normal, but are skew. However, as a rough works test, it might be worth while to calculate the arithmetical means and standard deviations of vacua. It would not be strictly accurate to do so, but, if the distributions are comparably skew, it might be worth while to make some calculation as a routine measure of dispersion.

The accurate calculation of dispersion of skew distributions is a thorny subject, about the refinements of which only a professional statistician is competent to advise. I would, however, suggest that the distributions shown in Mr. Blackwood's charts are rather like those of the kind investigated by Dr. C. B. Williams in connection with some entomological problems,[1] and further by Mr. Yule,[2] and again by Williams,[3] in connection with the comparison of the sentence length of different authors. Williams has shown that some kinds of skew distributions became normal, if instead of the frequency distributions of actual numbers (say, of words per sentence) the logarithm of the numbers is taken. Mr. Blackwood has already expressed some of his figures as logarithms, but that was solely for convenience in plotting, and not as a statistical device. For Williams' method it would be necessary to express abscissae (vacua) as logarithms and the ordinates (frequency) in ordinary numbers.

If this suggestion is to be of any value in connection with vacua in cans, two points must be noted: (*a*) the

vacua run "the wrong way"; (*b*) as Williams has pointed out,[2] where small numbers are concerned (such as inches of vacuum or of pressure) of the order of 10 to 25, irregularities occur owing to the irregular distribution of the logarithms of integers. One way of turning the abscissal values round is to convert vacua into pressures by subtracting the readings from some convenient number such as 29 inches, or, say, 75 in the case of centimetres. The second defect can be got over by taking a smaller unit than an inch, such as $\frac{1}{4}$ of an inch, or—possibly better—taking the centimetre as the unit. The suggestion of taking the centimetre here as the unit is not based primarily on an abstract desire for international comity. To have an international standard unit might, however, be useful to firms having factories in more than one country.

To sum up, then, I suggest for the better understanding of distributions of vacua in cans, and of allied distributional problems:

(1) That the arithmetic mean and standard deviation be calculated provisionally for tests of samples of a reasonable size—such as those represented by Mr. Blackwood's Charts 1 and 2—as if the samples conformed to a normal distribution: this solely to obtain a rough working measure of dispersion.

(2) That it would be interesting to see whether such skew curves as those of Charts 1 and 2 can be transformed to an approximately normal shape by adopting Williams' device of plotting the vacua (or rather the difference of the vacua from normal atmospheric pressure or some other datum) on a logarithmic scale.

(3) That in order to make this comparison workable it is desirable to express, and hence to measure, the vacua in units of centimetres or (say) quarters of an inch.

(4) That due regard be paid to grouping.[4]

If suggestion 2 is shown to be sound, the log mean and the log standard deviation will provide a sufficiently accurate measure of dispersion, and hence an adequate basis for comparison of two samples, providing the samples are randomised, or at least free from bias introduced by the experimenter or by his material.

Furthermore, an approximately normal curve will not be more difficult to understand than is the skew curve, which is possibly more familiar in this connection; therefore it need not involve any fresh headaches to non-technical executives. The non-technical executives could well be educated up to the idea of having a numerical measure of variability.

These suggestions are intended to make *quantitative* comparison possible and to introduce what the canning industry appears to lack—namely, a measure of the variability inherent in some of its operations. I should welcome the comments of those who have access to suitable data. I say "who have access to data" because I am not in the position in which Williams and Yule found themselves in their investigations of sentence length: they had only to pick up a few books in order to have material with which to test their hypotheses. I have no such wealth of material relating to canning tests; and the data provided by Mr. Blackwood in his article are hardly sufficient to make a start. I do not doubt that research workers such as those of the Dewey and Almy Company will be equal to the arithmetic which I propose should be performed on material in their possession.

The calculation of statistical measures is almost as easy as finding a percentage, and is peculiarly satisfying. Its exposition in print makes it appear more complicated than it is.

Yours, etc.,
HUGH NICOL.

Harpenden, Herts.

REFERENCES

[1] C. B. Williams, *Annals of Applied Entomology*, Vol. 24, 1927, p. 404.

[2] G. Udny Yule, *Biometrika*, Vol. 30, 1939, pp. 363-390.

[3] C. B. Williams, *Biometrika*, Vol. 31, 1940, pp. 356-361.

[4] Unskilful grouping can introduce artifacts—*e.g.*, a minimum may be made to appear on a curve where none rightfully exists. For a discussion of this and related problems, see D. Mainland, *The Treatment of Clinical and Laboratory Data*. London, 1938.

Imperial Institute

THE annual report for 1942 by the Director, Sir Harry Lindsay, K.C.I.E., C.B.E., to the Board of Governors of the Imperial Institute has recently been published. The work of the Consultative Committee on Hides and Skins has been carried on, and progress has been made in the enquiry commenced last year into the cause of cracked grain in certain skins produced in Nigeria. Several enquiries relating to Empire hides and skins from official sources have been dealt with by the Secretary in conjunction with members of the committee.

Reports furnished during the period under review dealt with 378 samples relating to the following countries: United Kingdom, New Zealand, India, Southern Rhodesia, Cyprus, the Gold Coast, Kenya, Malaya, Mauritius, Nigeria, North Borneo, Sierra Leone, Tanganyika, the West Indies, the Belgian Congo, the French Cameroons and the French Congo.

Examples of investigations (other than those of a confidential nature) completed during the twelve months concerned are summarised, and include: the drying of cattle hides in Kenya and Nigeria; arsenic treatment of hides; agar and seaweeds from New Zealand; cassava starch from Nigeria; castor oil for lubricant purposes from Nigeria; Po-yok fruits from Sierra Leone; tobacco from Cyprus and essential oils from the Belgian Congo.

Among other products examined were: ground nuts from Southern Rhodesia, coconut oil from St. Lucia; sweet marjoram oil from Kenya, papain from Tanganyika, seaweed from North Borneo, etc.

Intelligence

The number of enquiries dealt with during the year was 911.

Among the enquiries dealt with were the preparation of potato flour for mixing with wheat flour in Aden; use of Lonchocarpus as a substitute for derris; cultivation and preparation of Roselle fibre (*Hibiscus sabdariffa*) for use for making bags to replace jute in British Guiana, sources and utilisation of cocoa butter and the nature and use of oil of *Argemone Mexicana*.

The London Chamber of Commerce

THE sixty-first annual report of the Council of the London Chamber of Commerce for the year 1942 gives a summary of special wartime services and a list of the departments and sections concerned.

There are now forty associations affiliated to the Chamber with a total membership estimated at 50,000, having the right of direct representation on the Council.

Dried Egg Products

Among the multitudinous matters of interest to the food industry and allied trades, handled by the different committees during the year was the distribution of egg products. Representatives interviewed the Director of Egg Supplies in connection with the Ministry's scheme of allocation of these commodities and a satisfactory solution of difficulties was arrived at.

Fuel Economy

A memorandum prepared by the Chairman (Lieut.-Colonel G. R. Harding, D.S.O.) was forwarded to the Board. This memorandum emphasised that lighting, whether for public or private premises, comprised but a small proportion of the current generated by power stations and that a cut of 20 per cent. in lighting would result only in a very meagre saving. Greater scope for economy lay in the use of electric current for power purposes, and the chairman suggested a way by which consumers making excessive use of electricity could be checked and, if necessary, penalised.

Canned Goods

There was considerable activity on the part of the Canned Goods Primary Brokers and Agents Section during the year.

The Section entered into negotiations with the Director, Canned Fish Division, of the Ministry of Food, with regard to the services which pre-war importing agents and brokers might render to the Ministry in connection with the importation of the 1942 pack of Portuguese sardines. It is with regret that the Section has to record that the Ministry carried through the transaction without making use of the pre-war importing agents and brokers in this commodity.

In March the Ministry of Food informed the Canned Good Primary Distributors Section that it was not expected that any further shipments of canned baked beans would be received from the U.S.A. and that the question raised by the Section that all traders, who pre-war imported canned baked beans, should be included in the scheme of distribution had, therefore, solved itself. In May, Lord Woolton gave the Section an assurance that it was the Ministry's policy to utilise so far as possible existing trade channels for distributing imported foods.

In October a deputation appointed by the Home-Produced Canned Fruits and Vegetables Sub-Section met Mr. N. G. Loughnane, C.B., Principal Assistant Secretary, Ministry of Food, when the need for maximum production of canned vegetables by English canners was stressed, and it was asked that the ban on the canning of vegetables other than for the Armed Forces should be lifted. In November, Mr. Loughnane replied that at the present stage of the war it was vitally important to exercise the strictest economy in the use of labour and materials and that the Sub-Section's request could, therefore, not be granted.

Other matters considered by the Section included the Sector Trading Scheme; purchase of Portuguese sardines by the Government; position of trade intermediaries; price and release of English canned fruits.

Fruit Pulp

The Executive Committee of the Imported Fruit Pulp Section received regular reports on the work carried out by the Fruit Pulp Association, Limited, on behalf of the Ministry of Food, and in May a general meeting of the Section was held, when the secretary of the Association attended and made a report on the negotiations which had taken place over the previous fourteen months with the Ministry of Food in regard to the remuneration to be paid to the Association. The chairman of the Section was invited, and agreed, to become a Director of the Association.

Sausage Casings and Allied Products

The Ministry of Food in March returned to their earlier proposal that membership of the collective buying organisation set up to handle U.S.A. casings should be extended to include all present importers of Canadian hog casings. A general meeting of such firms was convened, and a separate section of the Provision Trade Section formed for this purpose within the organisation.

Such questions as maximum prices for sheep casings, future import programme for casings from New Zealand, Australia, and South America, and the distribution of Government purchases from European and other sources not hitherto covered by these particular controls, have been discussed with the Ministry.

Detecting Decomposition in Meat

As a means of measuring one of the changes usually accompanying decomposition of uncooked meat, Hermann C. Lythgoe, Carl S. Ferguson and Elias B. Boyce, in a paper presented before a Symposium on Vitamins held by the Division of Agricultural and Food Chemistry at the one hundred and sixth national meeting of the American Chemical Society, stated that they compare the ammonia content with the total nitrogen in the same meat. If the ammonia content is less than 0·5 per cent. of the total nitrogen, the meat is probably free from decompositional substances of that character. If the quantity exceeds that figure, the meat is definitely decomposed as determined by appearance, odour, etc.

Fat rancidity is often the cause of decompositional odour, and this can usually be determined by measuring the amount of free fatty acids in the fat. Using these methods the Massachusetts State Department of Public Health, during 1942, prosecuted 144 persons and secured 136 convictions for the sale of decomposed meat or meat products, or for using them in the manufacture of sausages.

Ministry of Food

Latest Statutory Rules and Orders

The list given below is the continuation of the list of Orders published in *Food Manufacture*, November 1, page 376.

No.	*Date.* 1943.	PRICE FIXATION ORDERS
974	July 14.	Oats (Control and Prices) (Great Britain) Order. [Reg. 55, 55AA.] Revokes S.R. & O. 1941 No. 1765; and 1942 Nos. 1492, 1878 and 2540.
975	,, 14.	Barley (Control and Prices) (Great Britain) Order. [Reg. 55, 55AA.] Revokes S.R. & O. 1942 Nos. 1354, 2125, 2350, 2456 and 2541; and 1943 No. 14.
981	,, 15.	Amending the Feeding Stuffs (Maximum Prices) Order, 1942.
983	,, 15.	Amending the Potatoes (1943 Crop) (Control and Prices) Order, 1943.
1015	,, 20.	Order, revoking the General Licence, May 10, 1943, under the Green Vegetables (Maximum Prices) Order, 1942, and the Fresh Fruit and Vegetables (Restriction on Dealings) Order, 1943. Revokes S.R. & O. 1943 No. 691.
1018	,, 21.	Home-Grown Rye (Control and Prices) (Northern Ireland) Order. [Reg. 55, 55AA.] Revokes S.R. & O. 1942 No. 1980.
1019	,, 21.	Oats (Control and Prices) (Northern Ireland) [Reg. 55, 55AA.] Revokes S.R. & O. 1942 No. 1554.
1020	,, 21.	Home-Grown Dredge Corn (Control and Prices) (Northern Ireland) Order. [Reg. 55, 55AA.] Revokes S.R. & O. 1942 No. 1586.
1021	,, 21.	Barley (Control and Prices) (Northern Ireland) Order. [Reg. 55, 55AA.] Revokes S.R. & O. 1942 Nos. 1551 and 2358.
1028	,, 22.	Amending the Eggs (Control and Prices) (Great Britain) Order, 1942, and revoking the General Licence, July 8, 1941, deemed to be granted thereunder.
1057	,, 23.	Home-Grown Apples (Maximum Prices) (Great Britain) Order. [Reg. 55, 55AA.] Revokes S.R. & O. 1942 Nos. 1496, 1590 and 2161.
1063	,, 26.	Amending the Meat Products and Cooked Meat (Control and Maximum Prices) Order, 1942.
1086	,, 30.	Amending the Potatoes (1943 Crop) (Control and Prices) Order, 1943.
1130	Aug. 4.	Home Grown Beans (Control and Maximum Prices) (Great Britain) Order. Revokes S.R. & O. 1942 No. 1480.
1131	,, 4.	Threshed Feeding Peas (Control and Maximum Prices) (Great Britain) Order. Revokes S.R. & O. 1942. Nos. 1491 and 2426.

No.	*Date.* 1943.	BISCUITS
1253	Aug. 26.	Biscuits (Licensing and Control) Order. Revokes S.R. & O. 1941 No. 961 and 1942 No. 1635.
		CONTROL COMMITTEES
1304	Sept. 8.	(Constitutional) Order. Revokes S.R. & O. 1942 Nos. 1751 and 2132 as from January 1, 1944.
		FEEDING STUFFS
1190	Aug. 14.	Amending the Directions, January 15, 1943, supplementary to the Feeding Stuffs (Rationing) Order, 1942.
1237	,, 25.	Feeding Stuffs (Regulation of Manufacture) Order. Revokes S.R. & O. 1942 Nos. 2031, 2258 and 2521; and 1943 Nos. 460, 687 and 798.
		FISH
1085	July 31.	General Licence, under the Fish (Distribution) Order, 1943.
1229	Aug. 20.	General Licence, under the Fish (Supplies to Catering Establishments) Order, 1942.
1266	,, 28.	General Licence, under the Fish (Supplies to Catering Establishments) Order, 1942. (Fresh herrings.)
1347	Sept. 18.	General Licence, under the Fish (Supplies to Catering Establishments) Order, 1942. (Fresh herrings.)
		FLOUR
1275	Aug. 31.	Order, amending the Flour Order, 1943.
		FRUIT
1087	July 30.	Canned Fruit (Prohibition of Retail Sales) Order.
		POINTS RATIONING
1327	Sept. 14.	(Points Rationing) (No. 3) Order. Revokes S.R. & O. 1943 No. 1006.
		RATIONING
1004	July 19.	Meat (Rationing) Order.
1005	,, 19.	Preserves (Rationing) Order.
1262	Aug. 28.	Preserves (Rationing) (No. 2) Order. Revokes S.R. & O. 1943 No. 1005.
		SALVAGE OF WASTE MATERIALS
1200	Aug. 17.	Kitchen Waste (No. 4) Order.
		SPICES
1265	Aug. 28.	Spices (Control) Order.

News from the Industry

Changes in Government

It was announced on November 12 that Lord Woolton was to leave the Ministry of Food to take charge of post-war planning for the Government, with a seat in the War Cabinet.

Colonel J. J. Llewellin, M.P., succeeds Lord Woolton as Minister of Food.

Mr. H. U. Willink, K.C., M.P., succeeds Mr. E. Brown, M.P., as Minister of Health.

Lord Woolton is to have the highest authority to co-ordinate the work of every department concerned in post-war questions, including town and country planning; food, transport, housing; employment, home and export trade; demobilisation and the use of man-power generally.

The new Food Minister, Colonel Llewellin, went to Washington as Resident Minister for supply questions at the beginning of this year. He had been President of the Board of Trade and Minister of Aircraft Production, and had held junior offices at the Ministries of Supply and War Transport and the Admiralty.

* * *

New Director of Fish Division

Mr. F. S. Anderson, Food Executive Officer for the North-East of Scotland, has been appointed to succeed Mr. John Adamson as Director of the Fish Division of the Ministry of Food.

Mr. Anderson entered upon his duties as director-designate on November 1, and will take over full control as director on January 1. In his new post he will have his headquarters in London.

* * *

New Divisional Food Officer

Mr. W. J. N. Menzies, new Divisional Food Officer for North-East Scotland, was in charge of emergency feeding during the air blitz on London and other English cities.

He succeeds Mr. F. S. Anderson, who has been appointed Director of the Fish Division of the Ministry of Food.

At the start of the war Mr. Menzies was lent to the Ministry of Food by the Home Department of the Scottish Office.

He served for a time in the office of the Chief Divisional Food Officer in Edinburgh before going to the London headquarters of the Ministry. He organised the National Milk Scheme.

Mr. Menzies took over his new duties in the north-east on November 1.

* * *

Mr. John Adamson

Mr. John Adamson, who has resigned his position as director of the Fish Division of the Ministry of Food, took over in 1941 the problem of distributing fish on an equitable basis.

His zoning scheme, by limiting the areas into which wholesalers could send fish, was also designed to save transport and labour. He was entirely responsible for bringing in huge quantities of Icelandic fish as a means of increasing our own supplies, and he encouraged the importation of salt and frozen fish from Canada and Newfoundland.

His schedule of price was introduced at a time when the public was complaining that fish prices had risen in some cases 1,000 per cent. Mr. Adamson brought down these prices.

* * *

Institute of Fuel

Dr. E. W. Smith, C.B.E., was installed as President of the Institute of Fuel on October 14, and delivered a very interesting presidential address. He was for a considerable time in charge of the Gas Section of the Ministry of Fuel and Power, and recently resigned, much to the regret of the whole gas industry.

* * *

No Sweets for Christmas Parcels

Christmas parcels for H.M. Forces in India, Ceylon and East Africa must not contain chocolate or confectionery of any description, whether in tins or in ordinary wrappers.

Combined Food Board

President Roosevelt has announced that Mr. Claude Wickard, U.S. Secretary for Agriculture, has been appointed neutral chairman of the Combined Food Board. The Combined Food Board is carrying out an investigation into statistical, record and other data concerning food supplies and consumption in the U.S., the United Kingdom and Canada.

Discussions which it is hoped will enable the officials of the three Governments concerned to complete the investigations opened in Ottawa on November 8.

Mr. H. F. Angus of the Canadian Department of External Affairs and Chairman of the Food Requirements Committee leads the Canadian team, the other members of which are Mr. S. C. Cudmore, Dr. W. C. Hopper, Dr. W. C. Pott, Mr. Ian McArthur and Miss Anna Spears.

The British team is led by Mr. P. H. Barter, Assistant Director of Statistics, Ministry of Food; the other members being Mr. F. Northam of the Ministry of Food and Mr. W. A. Stuart-Williams of the British Food Mission, Washington. Mr. N. G. Loughnane, C.B., head of the British Food Mission in Ottawa, is attending the meetings in an advisory capacity.

The United States of America has sent a team of four, led by Professor L. A. Maynard, Professor of Nutrition, Cornell University. The other members are Mr. Montell Ogden, Mr. Lloyd G. Reynolds and Mr. Paul Koenig.

* * *

Turkeys and Geese from Northern Ireland

The Minister of Food has made an Order prohibiting, except under licence from the Ministry of Agriculture, Northern Ireland, the transport or consignment for transport of turkeys and geese from Northern Ireland to Great Britain and the Isle of Man from November 3, 1943. The Order is entitled The Turkeys and Geese (Prohibition of Transport from Northern Ireland) Order, 1943.

Chief Meat Agent for Scotland

The Ministry of Food announces with regret the resignation from October 31, 1943, of Mr. David M. Brown from the post of Chief Meat Agent for Scotland under the Meat and Livestock Control Scheme. Mr. Brown has held this post since the outbreak of the present war and was also associated with the planning of the Meat and Livestock Control Scheme under the Food (Defence Plans) Department.

The Ministry has decided not to fill the post thus vacated, but instead to appoint a Retail Trade Adviser for Scotland; an announcement will be made in due course.

* * *

Cereal Breakfast Foods Control

A new Order which came into force on November 14, 1943, revoked and replaced the Cereal Breakfast Foods (Control and Maximum Prices) Order, 1941, with its amendments, and in addition introduced provisions for the keeping of records by traders and the zoning of cereal breakfast foods. The zoning provisions prohibit the movement of cereal breakfast foods to wholesalers and retailers from zones in which production is insufficient to satisfy demand — *i.e.*, deficiency zones. They also regulate the movement from zones of surplus production to the deficiency zones. The zones and movements permitted are set out in a schedule to the Order. The Food (Sector Scheme) Directions will no longer apply to cereal breakfast foods.

* * *

The Food Documents (Fees) Order, 1943

An order has been made by the Minister of Food, in conjunction with the Treasury, re-enacting and modifying the Food Documents (Fees) Order, 1940, which deals with the replacement, on payment of a fee, of certain documents which have been lost, destroyed or defaced.

The list of documents for the replacement of which a fee is chargeable has been extended. Where the original document was issued by the Superintendent of a Mercantile Marine Office, the loss, destruction or defacement must be reported to the Superintendent of such an office. Replacement of other documents will be obtained at a Food Office.

The fee may be remitted where the loss, destruction or defacement of the document is not due either to the wilful act of the person to whom the document was issued, or to his negligence, or if the payment of the fee would cause a hardship.

An application for remission on any of the above grounds in respect of a document issued by a Food Executive Officer shall not be refused except with the concurrence of the Food Control Committee.

* * *

Pulse (Control and Maximum Prices) Order, 1943

The Ministry of Food announces that a new Order has been made controlling dried edible pulse. This new Order, which will be known as the Pulse (Control and Prices) Order, 1943, revokes and replaces the Threshed Home-Grown Peas (Control and Prices) (No. 2) Order, 1942, and the Dried Peas, Beans and Lentils (Control and Maximum Prices) Order, 1941, as amended.

The new Order introduces a maximum price of 7½d. per lb. for dried wrinkled peas and 4d. per lb. where these have been steeped or soaked in water. It also raises the price of hand-picked threshed home-grown peas on a sale to a retailer by 1s. per cwt. from 71s. to 72s. per cwt. The new Order came into force on November 14, 1943.

* * *

Argentine Cattle Trade

The Minister of Agriculture, General Diego Masson, speaking recently in Buenos Aires, referred to the new meat agreement concluded with Britain on behalf of the United Nations. He said that when the United States entered the war and combined her meat purchases with those of Great Britain the price of Argentine beef fell by about 2¼ Argentine cents a kilogram, live weight. The serious position of the Argentine cattle industry was fully explained to the British Government, they accepted the justice of the Argentine claim, agreed to satisfy it partly, and increased the prices.

The 1943 Onion Crop

The onion crop has turned out to be a very good one, and the Ministry of Food has been able to supply more onions than was anticipated to the large urban industrial areas.

* * *

The Rice (Control and Maximum Prices) Order, 1943

The Minister of Food has made a new Control and Maximum Prices Order for rice and rice products, which came into force on October 31, 1943. This Order revokes and re-enacts with certain slight modifications previous Orders dealing with these commodities. The principal provisions of the revoked Orders are repeated in the new Order, but the maximum prices for Board of Trade rice—*i.e.*, rice inspected and sealed by the Board of Trade as suitable for ships' stores—have been raised to those prescribed for Brazilian rice.

The attention of the trade is directed to the provisions of Article 5 of the Order, in which will be found details of the records of transactions which traders are required to keep.

* * *

Economy of Lubricating Oils

In an industrial bulletin the Ministry of Fuel and Power have published a plan for economy in the consumption of lubricants and industrial oils. It is divided into three main headings: (1) Receiving and Storing, (2) Issue and Application, (3) Reconditioning and Recovery.

The Ministry of Fuel and Power have received many replies to the appeal that each factory should make one member of its staff responsible for economy and efficiency in the use of lubricating oils. It is clear that managements are endeavouring to economise in the use of this product, which is vital for the offensive action of the fighting services. The task now is to intensify and sustain these efforts.

This bulletin, which is the first of a series, gives general advice as to how economies can be effected. Details of savings which can be made with various types of lubricants will be given in later bulletins.

Collection of New Zealand Butter Boxes

The Ministry of Food announces that arrangements have been made for the collection of New Zealand butter-boxes through the agency of the Container Recovery Service of S.P.D., Ltd.

The allowance payable by Container Recovery Service will be 6d. per complete box, or 5d. per case without lid.

Retailers are requested to extend their fullest co-operation, as New Zealand butter-boxes are urgently required for butter packing and other essential foodstuffs.

* * *

Control of Paper Order

The Ministry of Supply has issued Direction No. 9 under the Control of Paper (No. 48) Order, to replace Direction No. 8, recently issued, in which there was a defect.

The new Direction, which came into force on November 6, makes no change in the increased quantity of paper which may now be used in the production of news bulletins, magazines and periodicals.

Copies of the Direction may be obtained from H.M. Stationery Office, York House, Kingsway, W.C. 2, or through any bookseller, price 1d. (S.R. & O., 1943 No. 1575).

* * *

Price Control of Swedes, Turnips Beetroots and Parsnips

The Minister of Food has made the Root Vegetables (Maximum Prices) Order, 1943. The Order replaces the Swedes (Maximum Prices) Order, 1943 (S.R. & O. 1943 No. 101), and, in addition, prescribes maximum prices for turnips, beetroots and parsnips.

The Order applies only to crops sown in 1943. It came into force on November 10, 1943. Until that date the price of swedes was controlled by the Swedes (Maximum Prices) Order, 1943.

The price tables in the Order expire at the end of 1943. A further Order will be issued specifying prices for 1944. The growers' prices for this further Order will be those already agreed with the National Farmers Union.

American Farmers' Visit

Among the American farmers to visit the United Kingdom is Mr. Oscar Heline, who is President of the Grain Dealers Association of Iowa, President of the National Co-operative Elevator Association, and District Member of the U.S. Farm Credit Board.

The other members of the party —Mr. Robert J. Howard, of New York State, and Mr. Earl Robinson, of Wisconsin—have already begun their tour.

* * *

Vital Need for Salvage

The need for salvage remains vital. Every scrap saved, every economy effected, still counts as a worth-while effort in the plan for final victory. More and more staff salvage stewards are urgently needed, states the Ministry of Supply. Employers with five or more persons on their staffs are earnestly asked to appoint staff salvage stewards. Full particulars of the scheme can be obtained from the Directorate of Salvage and Recovery, Ministry of Supply, Berkeley Court, Baker Street, London, N.W. 1.

* * *

The Soft Drinks Order, 1943

The Ministry of Food announces that under the provisions of the Soft Drinks Order, 1943, manufacturers of flavouring compounds are required to hold a licence, since a considerable range of such compounds is included in the definition of "soft drink", as laid down in the Order.

The flavouring compounds referred to above are those consisting of citric acid, colouring matter and preservative, together with essences or essential oils, and in some cases fruit juices which are used by manufacturers in the production of soft drinks and other foodstuffs.

The Ministry is prepared to consider applications for licences from manufacturers of such compounds who were so engaged prior to May 1, 1942, and has circulated forms of application. Any manufacturer who was so engaged prior to that date and who has not received a form should write to the Ministry of Food, St. John's College, Oxford.

Supplies of Lard

The Ministry of Food announces that for the permit period November 14 to January 8 trade users, caterers and institutions will receive 50 per cent. of lard against the cake margarine entitlement, and all lard against the compound cooking-fat entitlement.

* * *

New Zealand Rations

Introduced in New Zealand is a butter ration of 8 ozs. for each person. Cream must not be consumed except for medical reasons. Cheese output for consumption within the Dominion remains at the present level.

The Minister of Supply, the Hon. D. S. Sullivan, announcing the regulations, said that, while still supplying American and New Zealand requirements in the South Pacific, New Zealand must make every effort to provide the additional quantities of food needed by Britain.—*Reuter.*

* * *

Agriculturists' Visit to U.S.A.

At the invitation of the United States Department of Agriculture, the Ministry of Agriculture and Fisheries, the Department of Agriculture for Scotland and the Ministry of Information have arranged for two agriculturists with practical experience of the food production campaign to make an extensive visit to the United States this autumn and winter to lecture on British farming and its war effort.

The mission will leave shortly and will consist of Mr. F. Rayns, O.B.E., M.A., Executive Officer of the Norfolk War Agricultural Executive Committee, and Mr. A. R. Wannop, B.Sc.(Agric.), B.Eng., Director of County Work, North of Scotland College of Agriculture, and Executive Officer of the Aberdeen and Ellon Agricultural Executive Committee.

Mr. T. Peacock, C.B.E., Past-President of the National Farmers Union, had accepted an invitation to join the mission, but in view of the recent statement by the Minister of Agriculture regarding discussions on post-war agricultural policy he felt that he should hold himself in readiness to assist the Union, and he has accordingly withdrawn.

Cuttle Fish as Food

South Coast fishermen report finding shoals of large-sized cuttle-fish in shallow water.

At Brighton the fish are being sold for food.

Cuttle-fish are considered a delicacy in many parts of South America.

* * *

Growing Mushrooms

Members of the Worthing district section of the mushroom-growing industry, in a letter to *The Times*, said: "The Government put a duty on imported mushrooms some years before the war, and a flourishing industry was built up. A large part of this crop was grown during the winter months in glasshouses. This crop provided work for the hands in the winter, and the spent beds manure for the land in the spring, and the crop was the principal winter crop of many nurserymen. Under the new cropping order it is treated as the 'forbidden fruit'. The flower grower is still allowed 10 per cent. of his pre-war crops, while mushrooms are not allowed. The apparent unreasonableness of this causes great dissatisfaction and leaves the mushroom- (food) grower wondering."

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Analyst on Food Faking

Among the samples analysed during the year, Mr. F. C. Bullock, Leicester City Analyst, mentions in his annual report:

A coffee extract costing 1s. 8d. per bottle which had an impressive label but only sufficient coffee to make one average cup of coffee;

A cheese powder which was made from partially skimmed cows' milk, dehydrated and powdered, and cost the equivalent of 10s. a pound. Three ounces of the powder completely filled a 6-oz. jar, and he reported that the powder was mixed with air fraudulently to increase its bulk;

Malt vinegar swarming with vinegar eels. "The presence of eels was good presumptive evidence that the sample was genuine malt vinegar, as the eels do not develop in artificial vinegar, but one can have too much of a good thing, and the supply was condemned."

Livestock for Europe

Sir John Russell, in an interview to pressmen in Edinburgh, said that it would take six to eight years to restore the cattle population of Europe, ten to twenty years for horses, six to ten years for sheep, and over six years for hens. He thought that a number of farmers in this country hoped that there would be a considerable market in Europe for breeding animals, but until the food was there to feed them there was no possible use in sending them.

* * *

Birmingham's Sweets and Chocolate

The proportion of the sweet and chocolate ration taken up by Birmingham people is remarkably high, said the Western Zonal Distribution Officer (Mr. F. Pountain) at a meeting of the Birmingham and District Confectioners Association recently. It is appreciably higher than the average for the country, he added, and he doubted whether local retailers could do more than a shade of extra trade with the stocks available.

Zoning, which had been in operation four months, had proceeded extremely well, Mr. Pountain said. In a big and complicated scheme of this description, in which many thousands of retailers and wholesalers were concerned, it would have been too much to hope to carry it out effectively without allowing for some margin of error. But, as a matter of fact, despite the more acute labour position, it had only been found necessary to take special action in comparatively few cases. Goods available in the western area, considering wartime conditions, were in acceptable variety, which they hoped would continue.

Members agreed that distribution had improved a great deal compared with six months ago.

* * *

Spices and Essential Oils

In their market report for November, Stafford Allen and Sons, Ltd., state that free spot stocks of lime oil are very scarce and high priced. The Lease-Lend oil is now coming through with the price in bulk at 45s. 9d. per lb. The shortage of rubbed herbs continues and none can be offered. Ground celery seed in available.

The essential oil distribution scheme is now well under way, with peppermint and lemon oils the first to be distributed. There is, however, a certain amount of drum leakage, which has meant a slight delay in distribution. It is mentioned in the report that the suppliers have no control over the quality of the oils, as the Ministry of Food is now in most cases the buyer and importer.

Cinnamon, nutmeg and mace are now controlled by the Ministry, a licence being necessary before sales can be effected, after manufacturers' process stocks have been used up. The purpose of this is to control the use of these spices, but no difficulty is anticipated with reference to securing the necessary permit.

Ground mixed spices, ground nutmeg (which now come under the Spices Control Order, 1948), continue firm.

Delivery has been made of the Lease-Lend lemon oil for distribution under the scheme. Unfortunately, the quality of the distilled oil is not all that could be wished for, and this matter is being taken up.

There is a wide range of cake and biscuit flavours available, and also a similarly wide range of vanilla essences.

More celery oil has been distilled this year than previously. It is an expensive oil—spot price 15s. oz.

* * *

Coconut Flavourings

Messrs. W. J. Bush and Co., Ltd., report exceptionally good business with their coconut flavour in both powder and liquid form, which is specially recommended for flavouring cakes, biscuits and fondants. Coconut Essence No. 1 is used for cakes and biscuits in the proportion of 2 fl. ozs. to 1 cwt. batch, and for fondants 1 fl. oz. Coconut Powder Flavour F.F.C. is used to the extent of 4 ozs. to 1 cwt. batch for cakes and biscuits, and 2 ozs. to 1 cwt. for fondants. Samples which we have tested, used in the proportions mentioned, impart a delightful flavour and fully warrant the makers' claims.

Mr. H. G. Wells

The University of London has conferred the degree of D.Sc. on Mr. H. G. Wells.

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Mr. C. G. Oakes

Mr. C. G. Oakes, a director of the Wellcome Foundation, Ltd., has been appointed managing director of Burroughs Wellcome and Co. (Australia), Ltd., and will leave for Sydney at the end of the year.

* * *

J. Long, Ltd.

A change has taken place in the management of the old-established firm of Messrs. J. Long, Ltd., preservers and canners, at Whitchurch. Lieut.-Colonel Brookhouse, M.V.O., and Mr. S. N. Howell have purchased an interest in the business; Mr. George Long, J.P., has resigned his office as managing director, but is remaining with the firm as technical director.

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Vegetable Buying Agents

London fruit, flower and vegetable buying agents have formed a company limited by guarantee to represent the interests of holders of licences from the Ministry of Food. The subscribers are: H. F. Darby, P. Cohen, H. Roberts, C. N. Pagilla, F. Southwell, A. G. Hewett, R. W. Hopper. Registered office: 33, Henrietta Street, W.C. 2.

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Gift of £100,000

A gift of £100,000 from Mr. W. H. Collins, chairman and managing director of Cerebos, for the endowment of the department of pathology and the institution of a chair of human and comparative pathology at the Royal College of Surgeons was announced at a meeting of the council of the college in London recently.

Mr. Collins intimated that he had made provision in his will for a bequest of a further £100,000 for the endowment of the department of anatomy and the institution of a chair of human and comparative anatomy.

Joint Chemistry Meeting

A joint meeting of the Society of Chemical Industry, the Chemical Society, and the Royal Institute of Chemistry, Bristol and South-Western Counties Section, was held on November 4 at Bristol, when a discussion on "Reconstruction in the Chemical Profession after the War" was opened by Professor Alex. Findlay, M.A., D.Sc., President of the Royal Institute of Chemistry.

* * *

The Nutrition Society

A joint meeting with the Food Group of the Society of Chemical Industry (Glasgow Section) was held in the Royal Technical College, Glasgow, on Saturday, November 6, 1943.

The subject was Diet and Industrial Health. Particular reference was made to the problem of the canteen in industry. Short papers, each dealing with different aspects of the problem, were presented by four or five principal speakers.

* * *

Food Control

At the annual meeting, at Manchester, of the United Kingdom Starch Trade Federation—held in the provinces for the first time—Alderman H. J. Hall, of Wallasey, of H. J. Hall and Co., Liverpool, was elected President.

Alderman Hall said the continued increase in membership was no doubt due to the fact that traders were realising that if they were to survive the storm of controls it was essential they should be united.

The council had been, and were still, engaged in negotiating with the Starch Division of the Ministry of Food, and he hoped it would be possible to agree on a scheme which would be fair and equitable to the distributive trade.

* * *

CORRECTION

Sieving of Foodstuffs

In a description of the vibrating screen manufactured by Pegson, Ltd., on page 393 of the issue of November 1 the speed of the screen shaft was given as 18,000 r.p.m. This should have read 1,800 r.p.m.

Food in the Factory

A week-end course on "Food in the Factory", arranged by the Extra-Mural Department of the Manchester University, was opened in October by Mr. William Mabane, Parliamentary Secretary to the Ministry of Food.

Dr. Magnus Pyke (Scientific Advisers Division, Ministry of Food) was the lecturer on the general principles of dietetics, and Mrs. S. Murray-Blair, Chairman of the Industrial Catering Association, Northern Region, discussed the practical application of these principles to industrial catering.

Miss M. Berry (Canteen Adviser, Factory Department, Ministry of Labour) talked on the psychology of mass feeding, and Mr. A. Surman, Honorary Food Control Secretary, Industrial Catering Association, dealt with Ministry of Food orders.

* * *

A Protective Covering

A product which should prove useful in the chemical laboratory has recently been introduced by Townson and Mercer, Ltd., under the name T. & M. S88. It is a resistant coating for apparatus, and can be used on taps, pipes, girders, shelves, ovens, etc.

It is composed of a phenol-formaldehyde resin, but instead of being polymerised by heat it is polymerised by the addition of the catalyst in a definite proportion to the resin. The catalyst is supplied with the resin in a separate container and is mixed in when the resin is required for use. After the addition of the catalyst the resin can be used for 12 hours before it begins to thicken appreciably.

The coating is remarkably fume- and heat-proof; has a hard surface; dries in 2 to 8 hours and increases in chemical hardness up to 10 days; can be brush or spray applied. It is suitable for the protection of most materials, although in some cases a primer is necessary.

The fully hardened coating is extremely resistant to all chemical fumes and will resist most dilute acids and alkalis for considerable periods. Strong alkalis tend to soften and discolour it, but do not harm it permanently if washed off fairly quickly.

Rose Hips

Target for this season's collection of rose hips averages 20 tons per county. The Ministry of Supply estimates that this will provide sufficient rose-hip syrup for children during the coming year.

Rose-hip syrup is rich in vitamin C, and contains twenty times as much of this vitamin as orange juice.

Although pleasant confections and syrups can be made at home by anyone who has sufficient sugar, experience has shown that home-made methods often entail material losses of the vitamin content. National Rose-hip Syrup is made only by approved manufacturers and must conform to a definite vitamin standard.

* * *

U.S. Food Output

American farmers are producing enough food this year to provide U.S. civilians with a nutritious diet and meet military and Lend-Lease requirements, according to a War Food Administration report issued in Washington.

If the supply of food available for civilian use were distributed equitably and prepared without loss of value, everyone in the U.S. could have more nutrients than are essential for health, with the single exception of riboflavin.

According to the British information services, the British diet compares favourably with both standards, except for notable deficiencies in vitamins A and C, but the lack of these nutrients has not as yet had a measurable effect on the population.

* * *

Christmas Cheer in Germany

The German people are to receive extra rations for Christmas, according to Berlin radio.

All ration-holders, who must apply not later than November 8, will be entitled to 1 lb. of wheaten flour, ½ lb. of sugar and ¼ lb. of butter.

Adults, in addition, will receive 1½ ozs. of "genuine coffee", half a bottle of brandy, and 4 ozs. of sweets, and children under eighteen will have ½ lb. of sweets and 6 ozs. of sugar.—*Reuter.*

OBITER DICTA

● The end of the war will not mean more food immediately.—*Mr. Mabane.*

● Take a sausage. What is its status in law?—*A Solicitor in Recent Food Prosecution Case.*

● In a Piccadilly shop you can buy for a couple of scores of bobs pineapples in brandy, peaches in gin, pears in Kummel.—*William Hickey.*

● At the end of this war there will be a period of insufficiency of food in the world, and for years to come we shall be on short rations.—*Mr. Tom Johnston, Secretary of State for Scotland.*

● Workers of the future will require fears of unemployment and poverty to ensure the necessary drive in this world of internal and international competition.—"*The Bankers' Magazine.*"

● The post-war larder may be so stacked with packages of dehydrated foods that a month's vegetables may be carried home in one package under one arm, and cost less than half pre-war price.—*U.S. Food Expert.*

● It is hoped that all housewives who agreed to register their height and weight at local chemists' shops will continue to work with us. The investigation has an important bearing on the national food economy. —*Lord Woolton.*

● As a civilian I was a Food Technologist at the Massachusetts State College in Amherst, Mass., one of the few colleges in the world teaching that subject. We have a complete file of your excellent journal FOOD MANUFACTURE. — *Lieut. L., U.S.A. Army.*

● We happen to live at a time when careful planning and large-scale organisations are absolutely essential. We cannot live adequately without them. If we are idiotic enough to imagine that individualism can work again, after we have been shown most thoroughly that it cannot, we shall find ourselves in a world in which a few people, rich, powerful and ruthless, do what they like and the rest of us can hardly begin to live our lives. —*J. B. Priestley, in "Reynolds."*

South African Fish-Liver Oils

Research on fish-liver oils has resulted in the development of a profitable industry which is supplying 10 per cent. of the allied nations' total requirements of vitamin A.

Three factories at the Cape are now processing fish-liver oils of all types, and thousands of gallons of high-grade oil are being exported for medicinal and other essential purposes. Of 30,000 gallons sent to England, the greater part is supplied to the Ministry of Food. South Africa has discovered that her marine fishes not only produce vitamin A of a potency far in excess of cod-liver oil, but in general they compare in strength with halibut oil. The liver of the steenbras fish, in fact, often gives vitamin A of a potency eight times greater than halibut.

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International Fisheries Conference

An International Fisheries Conference met to discuss the possibility of concluding, on the termination of hostilities, an International Fisheries Convention to replace and, where necessary, to supplement the Anglo-French Convention of 1839, the North Sea Convention of 1882, and the Anglo-Danish Convention of 1901, to which some of the countries are already parties, by one single up-to-date Convention conforming to modern practice. It was also proposed to incorporate in any proposed new Convention the provisions of the International Convention of 1937, dealing with the use of nets with meshes below a certain size, and the taking, landing and selling of certain kinds of fish below a certain size. This latter Convention, although substantially operated by the United Kingdom, had never formally become effective, as all the countries who had signed it had not ratified it prior to the outbreak of war.

Satisfactory progress was made at the Conference, and the delegates completed the preparation of a draft Convention which they unanimously decided to submit to their respective Governments for consideration, with a view to final agreement at a further conference to be convened as soon as circumstances permit.

COMPANY REPORTS

United Dairies Limited

Mr. Leonard Maggs (chairman and manager) presided at the twenty-eighth ordinary general meeting of United Dairies, Ltd. In the course of his statement, which was circulated with the report and accounts, he said:

"There is not much for me to refer to in the accounts which are annexed. The liquid assets, including Government securities £1,099,266 and tax certificates £1,036,050, show a considerable increase compared with pre-war days, which is reflected in the reduced amounts owing from subsidiary companies. The position is due to our operating largely under Government control. The Minister of Food acquires and makes payment for our manufactured products on production, thus substantially reducing the volume of stocks we have to carry. On a return to normal conditions of trading, very large sums will be needed for financing stocks and for re-equipment.

"The profits of the group are higher than last year, but, as in preceding war years, only sufficient revenue has been brought in from subsidiary companies to maintain dividends as previously. In view of the uncertainties of post-war trading, it is considered only prudent to leave the surplus with the trading companies. Specific reserves have been made in the accounts to cover the estimated liability for taxation on the profits under review, and for deferred repairs.

"The rationalisation of our milk businesses is nearing completion, and has made possible economies in transport and man-power. The resultant loss of freedom and other inconveniences are irksome, but have been willingly accepted by consumers in the national interests. I welcome the measures taken by the Minister of Food to improve the quality of the nation's milk supply. In time to come I feel sure that these will stand high in the long list of services so efficiently rendered by Lord Woolton to the nation. I am only sorry that the difficulties, under wartime conditions, of securing the necessary machinery will delay the full realisation of them. I look forward to the time when all milk will be pasteurised and thus made safe for human consumption.

"Owing to shortage of labour and materials, our service to customers has had to be curtailed, but we have managed to maintain the high quality of both our milk and our products. The gradings of our products acquired by the Minister of Food have been excellent.

"Under schemes of concentration of industries designed by the Government to conserve man-power and release factory space for essential purposes, one of our factories has been closed down. On the other hand, in connection with the concentration of another section of our industry, one of our factories has been left as one of the few plants operating.

"Our engineering and utensil companies continue to work at full pressure, but owing to the large amount of Government work required of them, coupled with the shortage of labour and materials, they have been unable to satisfy fully the demands made on them by the dairy industry.

"Our laboratory and scientific departments, despite depletion of their staffs, have been able to continue their researches and maintain their rigid quality controls of milk and milk products."

* * *

National Canning Company Ltd.

The twelfth annual meeting of the National Canning Company was held at Wisbech. The following is an abstract from the chairman's statement, which was circulated with the report and accounts:

"As you will have seen from the accounts, the profits, after making full provision for all known and estimated liabilities, including E.P.T., income-tax and war damage contribution, amount to £49,891, compared with £30,647 in the previous year. While the combined earnings of the company and its subsidiaries, before charging E.P.T., were again very satisfactory, we were not able to reach the high level of production and profits attained last year.

"From the directors' report you will have seen that, after provision for taxation and the payment of the dividend on the Preference shares, there is an available balance of £111,341. Your directors recommend the payment of a dividend at the rate of 10 per cent., less tax, on the Ordinary shares, and the transfer of £15,000 to the reserve account, bringing that account up to £145,000 and leaving a balance of £73,091 to be carried forward.

"I mentioned in our last report that dehydration plants were being installed in two of our factories, and, while these are not yet completed, it is hoped that in our next report we shall be in a position to say they are in full production. The frosted foods section of our business has remained closed down, but the machinery and plant is in readiness to take full advantage of the demand immediately the restrictions are removed.

"The crop situation during last summer was quite satisfactory, but the immediate outlook for vegetables is not as good as it might be. So far as the outlook for the current year is concerned, the restrictions now in force have caused our turnover to contract. This condition of affairs might change at any time, but present indications do not point to any relaxation."

* * *

Horlick's, Ltd.

The following is an abstract of the chairman's statement circulated at the ordinary general meeting of Horlick's, Ltd.: "A year ago I was able to announce that the outlook for the period now under review was not unfavourable, and you will see from the accounts that the trading position disclosed gives good grounds for satisfaction in view of existing restrictions and heavy taxation.

"So far as the balance-sheet is concerned there is little that calls for special comment. Fixed assets, after the usual provision for depreciation, show little change and remain at a conservative figure, while the values at which our various subsidiary company interests are expressed continue to be satisfactory. 1942 was a very busy year for our Australian company, which, in addition to meeting the substantial requirements of Government and other war outlets and keeping the parent company's overseas markets supplied to the fullest extent permitted by the shipping situation, has also succeeded in making a consider-

ably larger output available for domestic consumption. The position as to net current assets remains very satisfactory.

"Passing to the profit and loss account, it will be noted that the net trading profit, after provision for excess profits tax, is rather higher than the figure for the preceding year, the disposable balance being £235,334 as compared with £218,136. Our proposals for dealing with this balance are set out in the report of the directors."

* * *

Batchelor's Peas, Ltd.

The offer of Lever Bros. and Unilever, Ltd., to acquire the Ordinary share capital of Batchelor's Peas, Ltd., was referred to in the Chairman's (Mrs. E. H. Gasking) address at the seventh Ordinary Annual General Meeting of the company. She stated that the shareholders of the company had recently received a circular from the board setting out the offer, and went on to say that the three "Founder Directors", who are very substantial shareholders, consider the offer a favourable one and have accepted it. Further, it is a unanimous recommendation of the board to suggest that the shareholders generally should accept this offer. The anticipated increase in the development of Messrs. Lever Bros. and Unilever, Ltd., in the sphere of food production offers this company a wonderful opportunity for a very rapid ascent of the steep post-war gradient; and now, surely, is the right time—without militating against our maximum contribution to the war effort—to have our plans wisely formulated for the future prosperous course of our peacetime production and distribution, said Mrs. Gasking.

The offer of Lever Bros. and Unilever, Ltd., is £1 nominal of Lever Bros. and Unilever Ordinary stock plus 1s. 6d. in cash for every two Ordinary shares of Batchelor's Peas. The £1 Ordinary stock units of Lever Bros. and Unilever were recently quoted at 36s. 6d. and Batchelor's Peas 5s. shares at about 18s. 9d. With the 1s. 6d. in cash the bid is thus in line with market values.

Mrs. Gasking stated at the meeting that the profit for the year amounts to £142,521, and to this must be added £30,656 brought forward from last year, which makes a total of £173,177. From this sum must be deducted Preference dividends, which absorb, with income tax, £13,978, provision for taxation requires £90,000 and the transfer to capital redemption reserve of £6,175, making a total deduction of £110,153, which leaves an available balance of £63,024.

The directors recommend the payment of a dividend of 15 per cent. on the Ordinary share capital, absorbing with income tax £30,000, leaving a balance of £33,024, which it is proposed shall be carried forward to next year.

Cremier Ice Cream

Messrs. Leonard Maggs, G. I. Price and Tudor H. Price, all directors of United Dairies, are on the Board of Cremier Ice Cream Company. Formed on September 24 as a private concern with a capital of £100 in £1 shares, the company is to acquire the business of another of the same name.

* * *

New B.D.H. Chairman

Dr. F. H. Carr has been elected chairman of British Drug Houses, Ltd., in place of Mr. C. A. Hill, who resigned from that position and the managing directorship on October 1. He has filled these offices since January, 1909. Mr. F. C. Oscar Shaw is the new managing director.

* * *

Carltona Ltd.

Carltona, Ltd., food manufacturers, appealed in the Court of Appeal from the judgment of Mr. Justice Hilbery dismissing their action against Lord Woolton, Mr. Ernest Bevin, and the Commissioner of Works.

The company's factory at Willesden was requisitioned under Defence (General) Regulations, 1939, and the company claimed a declaration that the requisition notice was invalid and an injunction. Mr. Justice Hilbery, dismissing the action, said: "This court has no power to review the way in which the competent authority has exercised the power given to it by Regulation 51".

CHANGES OF ADDRESS

Sir John and Lady Russell

Sir John and Lady Russell have now settled in their new home at Campsfield Wood, Woodstock, Oxfordshire.

* * *

Br. Chemical Plant Mfrs. Assn.

The address and telephone number of the British Chemical Plant Manufacturers Association and also the Food Machinery and Chemical Export Group is now: 26, Portland Place, London, W. 1. Telephone No.: Langham 3121.

* * *

OBITUARY

Lieut.-Col. T. D. Young

We regret to record the death of Lieut.-Colonel Dunlop Young, O.B.E., D.V.S.M., M.R.C.V.S., F.R.San.I. He retired in 1934 from the dual position of Chief Veterinary Officer to the City Corporation and Chief Meat Inspector for the London Central Markets.

His knowledge and his skill as an administrator proved very useful to the Government in the last war. A Captain in the Territorials at the outbreak, he was sent to Woolwich to train for hospital command and to reorganise the Remount Veterinary Section. After several important assignments he was sent as a Major to command No. 23 Veterinary Hospital at St. Omer. In 1917 he was recommended for the D.S.O., but new regulations prevented his receiving it and he was given the military O.B.E. In 1918 he was mentioned in despatches and promoted to Lieut.-Colonel.

Among other things, he was Examiner for the Royal College of Veterinary Surgeons and Member of Council, Royal College of Veterinary Surgeons; Member of Council, National Veterinary Medical Association; Corresponding Member, Argentine Veterinary Society; Honorary Member, Australian Veterinary Association; Lecturer and Examiner, Royal Sanitary Institute; Lecturer, London School of Tropical Medicine and Hygiene, University of London; Lecturer, Battersea Polytechnic; Special Correspondent to Journals; Abstractor for Veterinary Journals.

Information and Advice

Synthetic Cream

8,956. *Required, information on the making of synthetic cream.* (N. Ireland.)

Artificial cream and other emulsions rich in fat are made by using as protective colloids concentrated protein solutions of other phospho-proteins, to which may be added dissolved proteins, preferably globulins and albumen. The oil or fat is added gradually, with stirring, to the protein solution, and the mixing, which is effected by simple stirring, may be at a temperature at which the fat is liquid. With some kinds of emulsifying machines the mixture may be effected at below the melting-point of the fat. A fat having the desired melting-point may be prepared by melting together oils and hard fats which may be obtained by hardening oils.

Casein in Ice Cream

8,964. *We were very interested in the information in the article in* FOOD MANUFACTURE, *October*, 1943, *concerning the use of casein in the manufacture of ice cream and would like to have further information about this.* (Eire.)

Either dried skim milk or pure casein can be included to increase the " solids-not-fats " proportion of ice cream, casein possessing the following advantages: (1) It has improved keeping properties, since it is free from butter fat leading to rancidity (60 days' storage in unsealed packages is the maximum quoted for powders using dried milk); (2) it is free from lactose, a sugar contributing nothing towards sweetness and crystallising out on refrigeration, this leading to " sandiness " in the ice cream. On increasing the proportions of casein, viscosity increases, and there is claimed to be a change in texture from coarse to fine. A number of American and Canadian research bulletins refer to this disadvantage of lactose, to the advantage of casein (thereby the use of casein is not protected by patent rights), and to the use of soluble casein derivatives. This latter is distinct from the general bulk usage of casein itself. For example, Bird, Sadler and Iverson (Iowa Agr. Exp. Station Research Bulletin, 1935, **187**, p. 179) show that depending on the composition of the mix, a 2·5 to 5 per cent. replacement of the dry skim milk by sodium caseinate is advantageous, giving flavour improvement as well.

Zoller in U.S. Patent 1,598,033 made an increase of solids (without lactose increase) by using casein, thus avoiding the point where lactose crystallises with resulting " sandiness " and also imparting marked smoothness to the product. Dahlberg in U.S. Patent 1,962,552 also covers the preparation of high-quality casein for ice cream mixes in which whipping properties may be controlled at will. The patent referred to in Mr. Schofield's article (FOOD MANUFACTURE, October, 1943) is concerned only with direct ice cream making where it is claimed that pepsin assists in the swelling of the casein. In this case, too, an alkali (¼ ounce lime and ½ ounce sodium bicarbonate per gallon of mass) is included.

" Smoothness " in ice cream is to be expected when casein coats the incipient ice crystals and prevents large growth. But casein in dried milk will equally do this.

Literature on Fish Canning

8,848. *Required, literature on fish canning.* (London.)

In the book *Complete Course in Canning* the subject of sardines is covered, dealing with conveyance, scaling, cleaning, brining, drying, fry pack, pre-cooked and bake packs, and the raw vacuum pack.

An article, " Sardine Canning in Britain ", appeared in FOOD MANUFACTURE in April, 1932, being an account of a fish-canning factory situated in this country equipped with the latest plant and machinery. This gives illustrations.

In October, 1933, a fairly comprehensive article appeared on sardine canning in California, and in December, 1934, and January, 1935, a further article on the Californian outlook.

Other references of a general character published in FOOD MANUFACTURE are:

Canadian Canned Sardines. 1941. P. 116.
Drying of Sardines (Enquiry). 1940. P. 192.
Pilchards: Life History, Preservation and Canning. 1936. P. 390.
Sardine Canning in California. 1935. P. 7.
Sardines:
- Aluminium cans for (Enquiry). 1934. P. 185.
- Canning (Editorial). 1934. P. 79.
- Canning in California. 1934. P. 421.
- Lead in (Editorial). 1934. P. 39.

Canning of Pilchards in Cornwall. 1934. P. 386.
Sardine Canning. 1933. Pp. 323, 329, 362, 404, 396.
Sardine Canning in Britain. 1932. P. 111.
Sardine Canning. 1931. P. 313.
Sardine Canning Industry in Portugal. 1931. P. 22.

Information Supplied

8,861. *Advice about any substance or product which can be used for sealing small leaks in casks containing liquid. This to be applied either inside or outside the cask and which would not affect the contents, sauerkraut packed in either its own juice or brine. Also details of any books or book on the subject of coopering.* (Lancs.)

8,899. *Literature covering the process of bottling herrings, the manufacture of fish pastes and other fish delicacies on commercial lines.* (Scotland.)

8,903. *Information about vegetable juices and manufacturers of hydraulic presses, etc.* (Herts.)

8,904. *A formula for the manufacture of custard powder and also a colouring agent in powder form for a ginger cake or pudding mixture.* (Lancs.)

8,905. *Information regarding plant and equipment for* (1) *Cherry syruping*, (2) *Preparation of sauce*, (3) *Potato crisps.* (London.)

8,907. *Information on " upgrading " of cereal grains —e.g., wheat. To what extent this practice is carried out in the U.S.A., the Argentine and Great Britain.* (Scotland.)

8,911. *Names of can-opener manufacturers.* (Lincs.)

Recent Patents

These particulars of new patents of interest to readers have been selected from the "Official Journal of Patents", and are published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Specifications Published

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

551,653. BECHARD, J. R. M.: Treatment of residues in sugar manufacture.

551,672. CROWN CORK AND SEAL CO., INC.: Beverage-mixing apparatus.

551,692. BRITISH ARKADY CO., LTD., FORD, W. P., EGERTON, W. E., and MAIDEN, A. M.: Manufacture of edible products from soya beans.

551,704. EVERY, C E. (De-Raef Corporation): Manufacture of cheese.

551,708. BATCHELOR'S PEAS, LTD., TAYLOR, A. E., and LOCK, A.: Method of and machines for slicing food.

551,714. FIDLER, J. C., and HULME, A. C.: Method of preserving fruit.

551,827. BROOKS, J.: Process for the preservation of eggs.

551,865. HURDEN, E., and SNELLING, J. C.: Means for draining condensation water in flues of geysers and other heating appliances.

551,911. BARKERS (CONTRACTORS), LTD., and DIXON, E. K. PORTMAN-: Urns for dispensing tea and analogous alimentary beverages.

551,958. KUNZLE, C.: Foodstuff or article of confectionery. Cognate applications 14035/41 and 14945/41.

552,016. SPOONER, W. W.: Method and apparatus for cooking alimentary products.

552,050. LOWE CORPORATION, J.: Extrusion devices—for example, for extruding raw doughnuts.

552,094. BRITISH THOMSON-HOUSTON CO., LTD.: Electrical systems for the automatic control of temperature.

552,103. CANNING TOWN GLASS WORKS, LTD., WATSON, P. J., and HONEY, F. H.: Machines for making glass bottles, jars and like articles.

552,176. KENNEDY, D. S.: Grain drying and storing apparatus.

552,245. WINGFOOT CORPORATION: Producton of temperproof seals for bottles and the like.

552,256. LAWTON, G.: Apparatus for conching chocolate.

552,387. FROSTED FOODS, LTD. (General Foods Corporation): Refrigerating apparatus.

552,428. CLARKE, S. T: Fermentation of beer.

552,490 ATKINS, C. F. V., and MARSHALL, F. G.: Machines for printing upon cans.

552,491. FILMER, LTD., R. H., and FILMER, F. L.: Production of articles, boxes or the like, of cardboard or like material.

Abstracts of Recent Specifications

Improvements in or relating to the Preservation or Cooking of Edible Vegetables

Sulphur dioxide has long been used in the drying of fruits such as apples and peaches with active enzyme systems in order to prevent the loss of the natural colour and the development of off-colours due to the occurrence of oxidative changes. It has also been reported that in the drying of some fruits the presence of sulphur dioxide diminishes the loss of ascorbic acid during drying.

The invention may be carried out by scalding the vegetables in a dilute solution of sulphur dioxide or a sulphite in the scalding water, or the vegetables may first be treated with a stronger solution or with sulphur dioxide gas and then scalded with water or steam. The vegetables should be reduced in size to ensure reasonably uniform treatment through the whole bulk; thus cabbage may be shredded, and massive tissues such as potatoes or carrots cut into strips, discs or dice. The vegetables to be treated may have meat admixed, the mixture being subsequently dried for the preparation of soups. The strength of the scalding solution varies with the type of vegetable being scalded; with cabbage the strength should not in general exceed the equivalent of 4 parts crystalline sodium sulphite per 1,000 parts of scalding water and a preferred strength which gives maximal effect is equivalent to 2·2 parts of crystalline sodium sulphite per 1,000 part of scalding water. More dilute solutions still have a noticeable effect in preventing loss of colour and of ascorbic acid during scalding. With carrots the concentration of sulphite used may be the same as for cabbage. With potato the concentration of sulphite should be the equivalent of about 0·5 parts of crystalline sodium sulphite per 1,000 parts of scalding water.

550,076. *John Barker, Russell James Laurence Allen, and Leslie William Mapson.*

Trade Marks

The list of trade marks of interest to readers has been selected from the "Official Trade Marks Journal" and is published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

FLORIANA.—615,835. *Use claimed from the year* 1928. *Section* 12(2). Canned fruits. **James Gillespie Carruthers** and **William Nathan Biggs,** trading as **J. G. Carruthers and Co.,** Terminus Chambers, 6, Holborn Viaduct, London, E.C. 1; Produce Importers and Agents.

BONJELEX.—622,343. Table jellies (for food). **William Wilson Brown,** 27, Ratcliffe Terrace, Edinburgh; Manufacturer and Merchant. To be Associated wth No. 619,555 (3363) xxix and another.

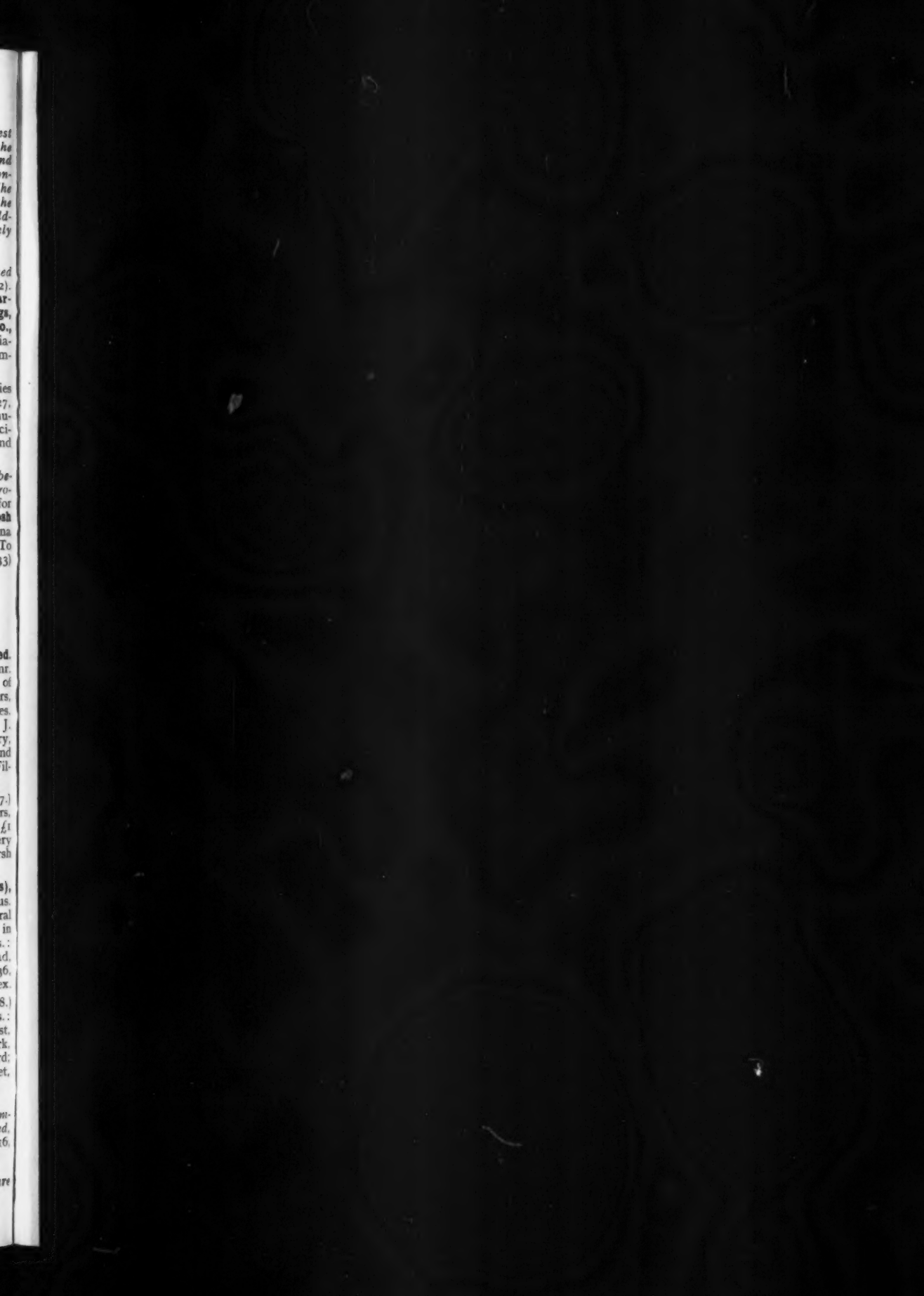
APPLEBYS.—622,301. *Advertised before acceptance. Section* 18(1) (*proviso*). Cereals (prepared for food for human consumption) and flour. **Josh Appleby and Sons, Ltd.,** 65, Carolina Street, Bootle, Lancashire; Millers. To be Associated with No. 273,550 (1433) xlii and another.

New Companies

P. F. Hawkins and Son, Limited. (380304.) The Stores, Othery, nr. Bridgwater, Som. To carry on bus. of wholesale and retail bakers, caterers, etc. Nom. cap.: £3,000 in £1 shares. Dirs.: P. F. Hawkins and Norah J. Hawkins, both of The Stores, Othery, nr. Bridgwater; M. W. Hawkins and Gladys M. Hawkins, both of 357, Filton Avenue, Filton, Bristol.

Alfred Newbery, Limited. (380377.) To carry on bus. of farmers, graziers, millers, etc. Nom. cap.: £5,000 in £1 shares. Permt. dirs.: A. E. Newbery and A. H. Newbery, both of Marsh Barton, Exeter.

John Alexander and Col. (Cereals), Limited. (380389.) To carry on bus. of dealers in cereals and agricultural produce, etc. Nom. cap.: £4,000 in £1 shares. Dirs.: Not named. Subs.: R. A. Plastrier, 68, Sandford Road, Bromley, Kent; W. G. Whight, 36, Springfield Gardens, Upminster, Essex.

Lustrac Plastics, Limited. (380478.) Nom. cap.: £1,000 in £1 shares. Dirs.: E. R. S. Holloway, 26, Crescent East, Hadley Wood, Herts; A. A. Clark, Oak House, Morgans Road, Hertford; G. G. Small, 15, Kings Road, Barnet, Herts.

Taken from the Daily Register, compiled by Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C. 2.